OCTOBER 29, 1960

Chemical Week

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Behind the scenes with Reichhold
SPECIAL REPORT . . . p. 79

Third-quarter pinch in profits hurts, but sales strength eases pain . . . p. 21

Glued automobiles? Epoxies, neoprenes snag growing role in car assembly . p. 27

Isoprene process clue turns up in new patent. Key: product cleanup by distillation . p. 39

Beecham's U.S. bid: How British specialties giant readies push . . . p. 51

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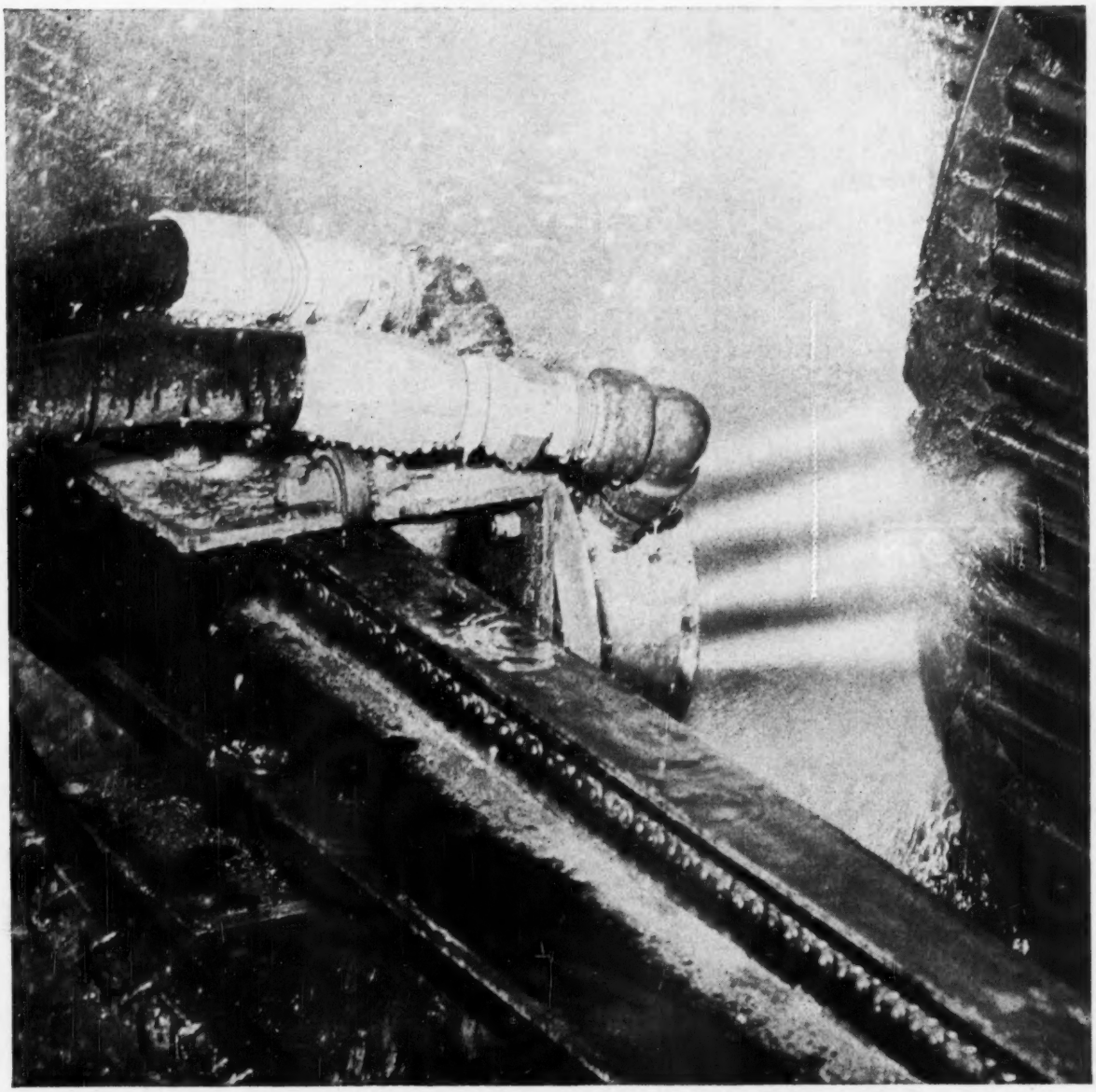
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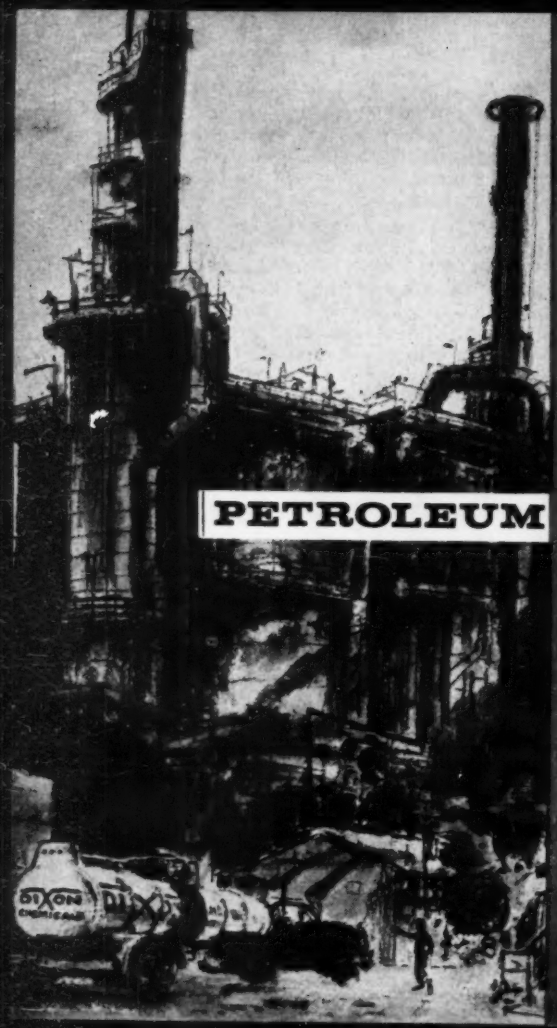
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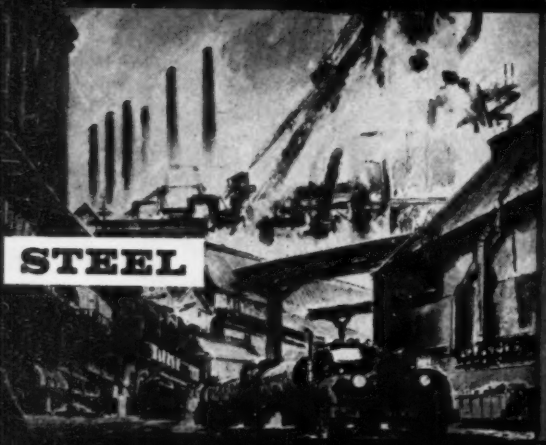
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ON THE COVER: Henry Reichhold, founder of the worldwide chemical empire described in the story beginning on page 79 is pictured during chat with CW's A. J. Piombino.

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Common U.S.-Canadian Market?

THE CANADIAN CHEMICAL INDUSTRY is committed to a policy of frustration. This is the feeling one came away with from the joint meeting in Montreal last week of the Commercial Chemical Development Assn. and the Chemical Institute of Canada's Economics Division (*see p. 22*).

Core of the problem, of course, is that Canada, an artificial political entity, is ill-designed to function efficiently as an economic entity. Its 17 million people are spread over a band hardly more than 150 miles wide and over 3,000 miles long. Therefore it is not economic for a single plant to serve more than a portion of an already small population.

One obvious result of this is that most chemical plants are of less than optimum size. A telling comparison: the U.S. chemical industry requires 83¢ worth of assets to produce an annual $1 of sales; in Canada, $1.25 worth of assets is needed to priduce $1 of sales.

The inexorable result is that Canadian chemical firms are, on the average, only half as profitable as U.S. firms. In '59, on sales of $1.35 billion and assets of $1.7 billion, Canadian firms made 4.5% profit after taxes on sales and 3.6% on assets; the U.S. industry, on the other hand, made 9.1% on sales and 11% on assets.

This in turn leads to the result that Canadian investors—as eager as anyone to get a good yield—are reluctant to invest in their own industries. The Canadian chemical industry is 70% foreign owned, mainly U.S. and British.

A concomitant result of small markets and low profit margins is lack of emphasis on research. It takes as much time and money to develop a new product in Canada as it does in the States, it is argued, and the potential profits are much lower. As a result the Canadian industry spends 2-3% of sales on research—again about half the U.S. percentage.

Canada desperately wants to get out of the "underdeveloped" category—i.e., an exporter of agricultural and mining products, an importer of manufactured goods—but it has neither the market nor the willingness to invest in manufacturing facilities.

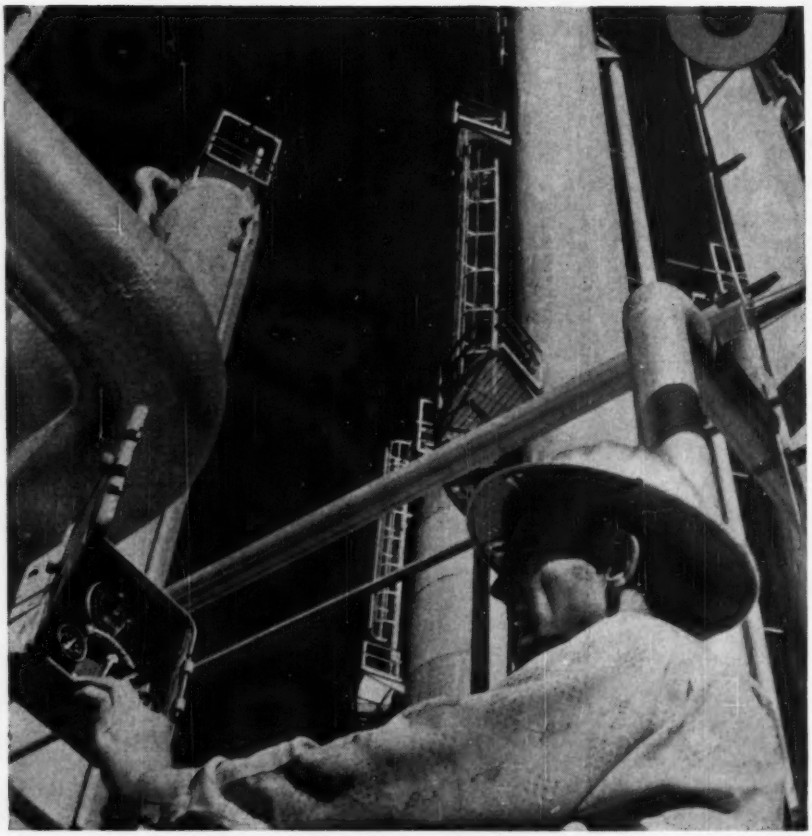
No amount of goodwill or hard work—and Canadians are certainly as industrious and capable as their stateside counterparts—can overcome the nation's built-in handicaps. Can nothing, then, be done except to possess one's soul with patience?

We think that a common U.S.-Canadian market should be explored, although one Canadian described such an eventuality as "a merger of a lion with a lamb." It seems to us that the Canadian economy already suffers the disadvantages of foreign domination without enjoying its possible advantages—and the chief advantage to be gained is a 10-fold growth of potential markets.

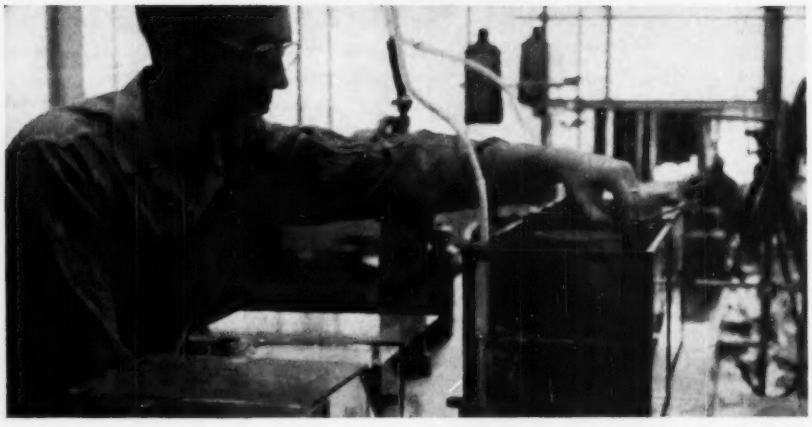
It is easy, of course, to propose a bold scheme and then walk away from the problems. We admit there are many thorns on the path to a common market, and that it would take long, intensive study to provide the necessary economic and political safeguards to both parties. Both countries stand to make some gains, but both countries must also be prepared to make some sacrifices. (And we don't think that political union must inevitably result from economic union.)

This is no pat solution, certainly; but what is the alternative? The Canadian chemical industry will continue to grow, but its growth will be stunted and distorted by pressures that only its government and ours, and not the industry itself, can overcome.

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LETTERS

High-Temperature Glass

TO THE EDITOR: We here at Haveg Industries read your article on the glass industries' research efforts (*Sept. 3, p. 73*) with great interest.

However, no reference to high-temperature silica-glass fiber materials . . . for rocket and missile applications should be made without reference to the two largest producers of these materials in cloth and other forms.

The Chemical Materials Division of Haveg Industries manufactures a line of silica fabrics called Sil-Temp. Our major competitor in this field, H. I. Thompson Fiber Glass, manufactures Refrasil. These two materials are now being used in nearly all the major IRBM and ICBM programs, either for re-entry nose cone or re-entry exit nozzle hardware. . . .

JOHN M. WARD
Manager, Sil-Temp Operations
Haveg Industries, Inc.
Wilmington, Del.

'Seed,' Not 'Feed'

TO THE EDITOR: . . . [Re] the CHEMICAL WEEK Report on metal organics (*Sept. 17*) . . . you have certainly done a magnificent job, as usual, in assembling a tremendous amount of detailed information. It has been read carefully by quite a few people here at Du Pont. . . .

In the ninth listing on page 61, Du Pont Semesan Bel seed disinfectant is listed as a feed fungicide. It should, of course, be seed fungicide. . . .

GEORGE H. SOULE
Du Pont Co.
Wilmington, Del.

Change in Strategy

TO THE EDITOR: The CHEMICAL WEEK Report on metal organics (*Sept. 17, p. 52*) is excellent, and all those participating in the gathering, evaluation, and codification of the material should be heartily congratulated on a job well done.

Clarification of certain information reported is in order, however, with particular respect to the statement that Olin Mathieson and Callery fuel plants were shut down because the cost of boron-based fuels was 20-50 times more than the cost for hydrocarbon fuels. It should be pointed out that the Olin Mathieson and Callery facilities are pilot plants, and the higher cost is certainly justified and usual practice for the chemical industry.

The actual facts of the matter (and they are documented in House Report No. 1191, 86th Congress, First Session — incorporated in the *Congressional Record*) are that the changing military strategy of the United States made the need for this type of fuel unnecessary on the scale that was originally contemplated. . . .

The government-owned, Callery-operated Muskogee, Okla., plant is now producing diborane and pentaborane.

E. G. SANNER
President
Callery Chemical Co.
Pittsburgh, Pa.

MEETINGS

Chemical Institute of Canada, Canadian chemical engineering conference, Quebec City, Can., Nov. 6-9.

Chemical Market Research Assn. Pittsburgh Hilton Hotel, Pittsburgh, Nov. 9-10.

Building Research Institute, 1960 fall conferences, sessions on "preassembled components" and "structural foams," Shoreham Hotel, Washington, D.C., Nov. 15-17.

Industrial Wastes Conference, Oklahoma State University, Stillwater, Okla., Nov. 16-17.

Manufacturing Chemists' Assn., 10th semiannual meeting and midyear conference, Hotel Statler Hilton, New York, Nov. 22.

Glass Container Manufacturers' Institute, semiannual meeting, Boca Raton, Fla., Nov. 28-Dec. 1.

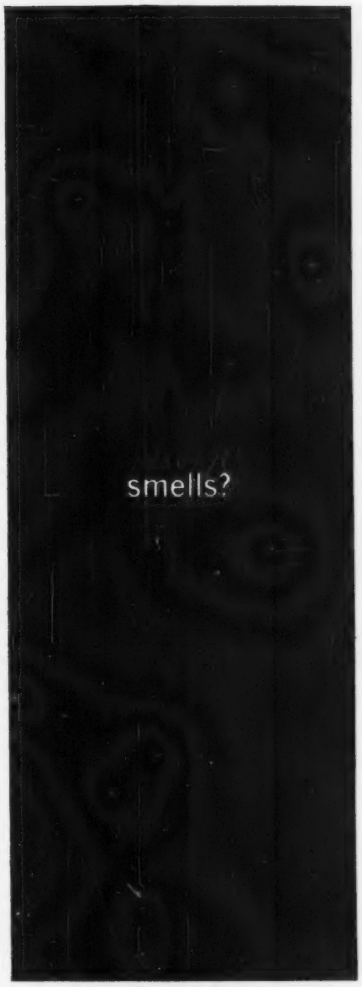
American Institute of Consulting Engineers, annual dinner, Waldorf Astoria Hotel, New York, Nov. 29.

American Institute of Chemical Engineers, annual meeting; theme: chemical engineering in government programs; Statler Hilton Hotel, Washington, D.C., Dec. 4-7.

American Nuclear Society, annual winter meeting, Mark Hopkins and Fairmont hotels, San Francisco, Dec. 12-14. Two highlights: talk on transuranium elements by Glenn T. Seaborg; and the Atom Fair, jointly sponsored by ANS and the Atomic Industrial Forum at the Masonic Temple, San Francisco, Dec. 12-16.

American Society of Agricultural Engineers, winter meeting, Palmer House, Chicago, Dec. 14-16.

American Assn. for the Advancement of Science, annual meeting, Philadelphia, Dec. 26-31.



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J. L. MILLER
Design Engineer

Mr. Miller graduated from Yale University with a B.S. in Chemical Engineering and joined National Carbon Company in 1948.

Since then, Mr. Miller has worked on applications of carbon, graphite and "Karbate" impervious graphite materials in corrosive services both in the field and in the laboratory. He has been particularly active in application engineering and development of graphite anodes for impressed current cathodic protection.

SAVINGS ON MAINTENANCE COSTS

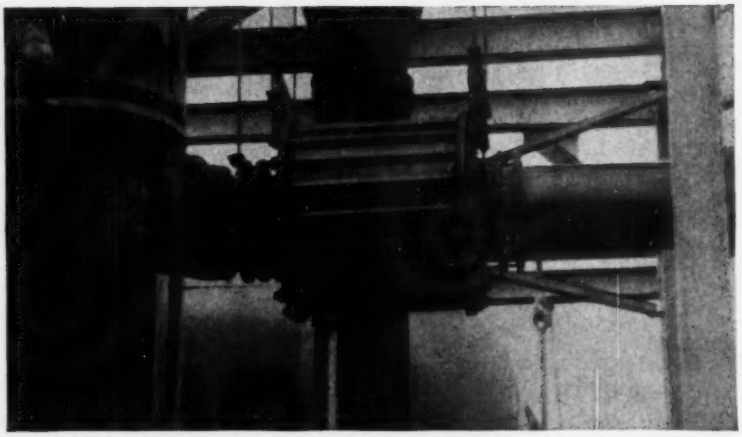
Two typical reports show trouble-free service with "Karbate" impervious graphite pumps in chemically cleaning equipment.

A petroleum company using a Type F centrifugal pump on its portable equipment cleaning rig reports, "We are very pleased with the performance of this equipment and would not hesitate to recommend its use to others for cleaning operations."

A chemical equipment cleaning company uses Type F centrifugal pumps for transferring muriatic acid from tank cars to storage tanks and from these tanks to trucks. "Karbate" impervious graphite pumps were installed here after attempts to move the acid by other methods were unsatisfactory. Maintenance on other corrosion-resistance lined pumps proved too costly. Twelve "Karbate" impervious graphite pumps, one to each station, are handling this operation with virtually no maintenance.

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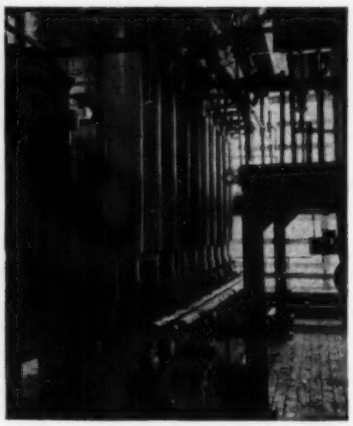


A 20" "Karbate" Impervious Graphite Entrainment Separator in an Acid Vapor Line.

SAVINGS IN RECOVERED PRODUCT

After installing a 20" "Karbate" impervious graphite Type MV entrainment separator on a spin bath evaporator, a major rayon producer recovered chemicals valued at approximately $2800 a year. These savings paid the equipment cost in roughly a year.

Based on the proved efficiency and savings in this installation, this company has purchased eleven additional units for use throughout its operations.



SAVINGS ON LONG EQUIPMENT LIFE

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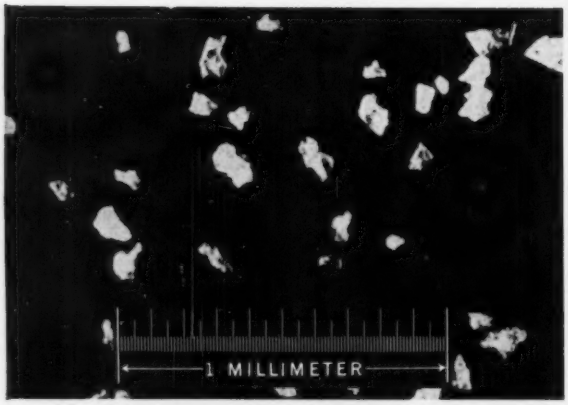
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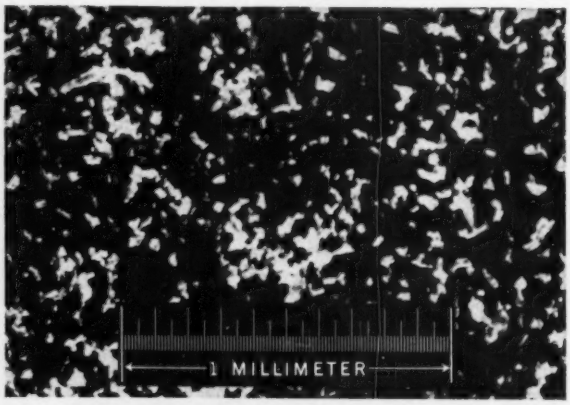
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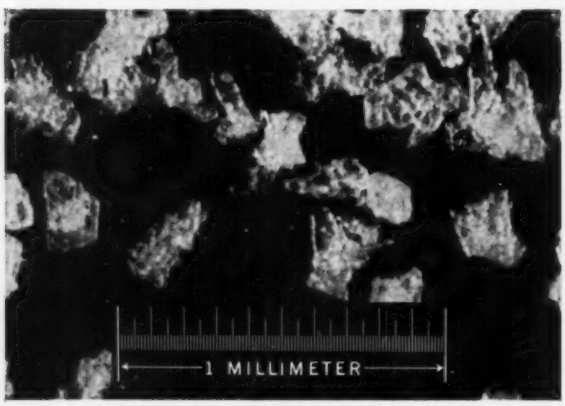
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100 Mesh.....5%	325 Mesh.....70.0%
170 Mesh.....20.0%	400 Mesh.....80.0%



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TYPICAL SCREEN ANALYSIS
CUMULATIVE PERCENT RETAINED BY

170 Mesh.....Trace	325 Mesh.....25.0%
200 Mesh.....2.0%	400 Mesh.....45.0%



Sodium Bicarbonate U.S.P. Granular No. 5 for use in effervescent salts, other pharmaceuticals and special types of cleansers.

TYPICAL SCREEN ANALYSIS
CUMULATIVE PERCENT RETAINED BY

42 Mesh.....Trace	100 Mesh.....92.5%
65 Mesh.....27.0%	170 Mesh.....99.0%
80 Mesh.....66.5%	



Sodium Bicarbonate U.S.P. Treated Free-Flowing for use in fire extinguishers and sponge rubber.

TYPICAL SCREEN ANALYSIS
CUMULATIVE PERCENT RETAINED BY

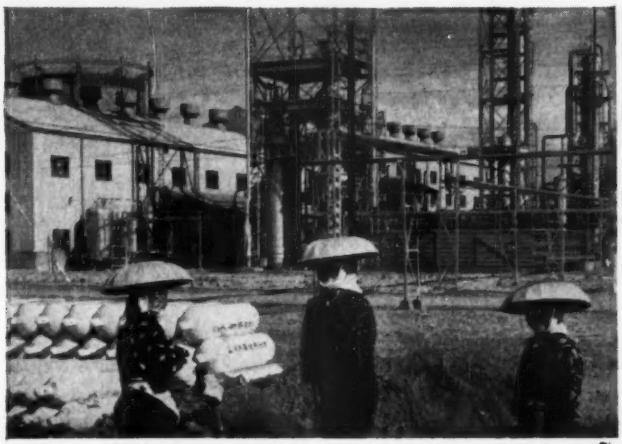
42 Mesh.....Trace	200 Mesh.....35.0%
100 Mesh.....5%	325 Mesh.....70.0%
170 Mesh.....20.0%	400 Mesh.....80.0%

Are you getting sodium bicarbonate of the specific grain size for optimum results in your process or for maximum shelf life and performance of your products? You can eliminate doubts by specifying Church & Dwight. This simple step will assure you of obtaining the widest selection of grain sizes available because Church & Dwight is the country's largest supplier of Sodium Bicarbonate U.S.P. You'll also receive for the asking unmatched technical service based on more than 100 years of experience with sodium bicarbonate. Unusual grain size requirements are given special attention. Try us and see.

CHURCH & DWIGHT CO., INC., 70 PINE STREET, NEW YORK 5, N. Y.

AMMONIA

NEW CHEMICO PLANTS TO BOOST WORLD CAPACITY 12½%



- 20 NEW PLANTS IN 7 COUNTRIES
- 8 NEW PLANTS IN THE U.S.A.
- 1,113,000 TONS PER YEAR

Since the first months of 1957, 13 new Chemico ammonia plants have been completed and put into operation. Another 7 Chemico plants are under construction or in the engineering stages. The design capacity of these 20 plants totals more than 1,000,000 tons per year.

Chemico's versatility in ammonia plant design is evidenced by the variety of raw materials on which these plants are based. While natural gas was the most common, crude oil, fuel oil and coke oven gas were also used. Regardless of feed stock, however, all thirteen of the operating plants were completed on schedule and started up without significant difficulties or delays. One plant, designed to produce 150 tons per day, took less than ten months to build, from initial go-ahead to completion of a satisfactory test-run.

This outstanding record in the ammonia field is just one of the reasons why chemical and petroleum companies all over the world continue to call on Chemico when they require ENGINEERING AT ITS BEST.

CHEMICO
CHEMICAL CONSTRUCTION CORPORATION
525 West 43rd Street, New York 36, New York

CHICAGO • DALLAS • HOUSTON • PORTLAND, ORE. • TORONTO • LONDON • PARIS • JOHANNESBURG • TOKYO

WHEN YOU BUY A BIRD



What you see

is a clean, compact, ruggedly built, totally enclosed, continuous production unit

— a machine designed, built and tested to fit your specific requirements for:

solids dryness

filtrate clarity

feed slurry consistency

feed volume

feed temperature

wash

fume tightness

pressure

What you don't see

are all the elements that contribute to the *certainty* that the Bird recommended for the job will do its work well and with continuous dependability and economy over a long period of time.

Among these hidden values are:

- thirty years of concentrated experience on solid-liquid separation problems as the leading designer and builder of almost all types of equipment for this purpose
- a firm policy of maintaining interest in your installation and its successful operation, not just until it's paid for but as long as it's on the job
- Bird is in the business of building machines that run and keep on running rather than in building up a source of repair parts business

If this is your idea of the kind of equipment to buy, you'd BETTER BUY BIRD. Ask us to make recommendations and estimates based, if need be, on pilot scale test findings at the Bird Research and Development Center.

BIRD MACHINE COMPANY

SOUTH WALPOLE, MASSACHUSETTS

BUILDERS OF THE COMPLETE LINE OF SOLID-LIQUID SEPARATING EQUIPMENT

Operators of the **Bird Research and Development Center** for pilot-scale testing to determine the correct equipment for the job. Yours to use.

Application Engineering Offices:

EVANSTON, ILL. • ATLANTA, GA. • HUNTINGTON, W. VA. • LAPORTE, TEXAS • WALNUT CREEK, CALIF.

Eastman Briefs
FOR OCTOBER

Eastman Inhibitors (2nd edition)

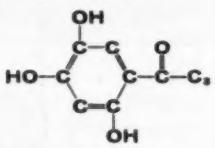
Ever ponder the statement: "Due to many requests, we bring you once again..."? We have, and like you perhaps, often questioned the truth of such a statement.

So, in all honesty we must admit we've received no requests for a re-run on this ad about inhibitor chemicals which appeared last January. However, since several thousand people wrote in for more information, we confidently expect that there are many more readers searching for better product protection against the property-degrading activity of oxygen and ultraviolet light.

We want to get in touch with them.

For those who were in the reading audience before, there's addenda to pique your interest, such as recent FDA approval on B-19 for food-packaging use.

Eastman Inhibitor THBP



Trihydroxybutyrophenone

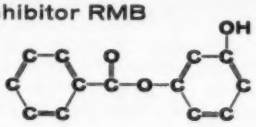
Form	*pale yellow solid*
Melting point	*150-153°C.*
Solubility	*alcohol, oils*

To excellent compatability in polyolefins and paraffins, add high antioxidant activity, and now approval for food-packaging use (see Federal Register *25*, 866, Feb. 2, 1960).

Eastman Chemical Products, Inc.
Kingsport, Tennessee

B19

Eastman Inhibitor RMB



Resorcinol Monobenzoate

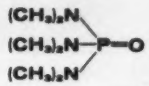
Form	*white crystalline solid*
Melting point	*132-135°C.*
Solubility	*most organic solvents*

For ultraviolet stability in cellulosics and certain polyesters, and specifically in applications where color is important.

Eastman Chemical Products, Inc.
Kingsport, Tennessee

B20

Eastman Inhibitor HPT



Hexamethylphosphoric Triamide

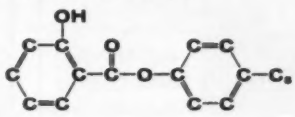
Form	*colorless liquid*
Boiling range, 739.4 mm.	*230-232°C.*
Solubility	*polar and non-polar solvents*

Poly (vinyl chloride) formulated with HPT and a heat stabilizer can take seven year weathering in stride. Interesting too for aqueous systems, since HPT is miscible with water in all proportions.

Eastman Chemical Products, Inc.
Kingsport, Tennessee

B21

Eastman Inhibitor OPS



p-Octylphenyl Salicylate

Form	*white crystalline solid*
Melting point	*72-74°C.*
Solubility	*most organic solvents*

In an accelerated weathering test (ASTM D795-48) a 50 mil polyethylene film containing 1% OPS withstood 1,045 hours before the first sign of cracking, crazing or embrittlement (control value was 200). Good in polypropylene, too.

Eastman Chemical Products, Inc.
Kingsport, Tennessee

B22

Chemicals Division
Eastman Chemical Products, Inc.
subsidiary of Eastman Kodak Company
Kingsport, Tennessee

JW

Please send more data on these chemicals:

B19 ☐ **B20** ☐ **B21** ☐ **B22** ☐

Name _____

Title _____

Company _____

Address _____ Zone No. _____ State _____

CLIP AND FILE

ADVERTISEMENT

check into Airco's new VINOL polyvinyl alcohol resins

IN THESE FIELDS ▸	ADHESIVES*	TEXTILES	PAPER	PLASTICS	SPECIALTIES
	COMPOUNDING	SIZING	SURFACE SIZING	MOLDED PRODUCTS	EMULSIONS
FOR THESE APPLICATIONS ▸	for hard-to-bind surfaces	warp	paper	compression molded	non-ionic emulsifiers
	fast adhesion types	nylon hosiery yarns	paperboard	extrusion molded	thickeners
	remoistenable types	FINISHES	glassine	FILMS	CERAMICS
	wet strength types	thermosetting modifiers	COATING paper	water soluble	binders
	colloidal thickeners	non-permanent types	paperboard	grease resistant	OTHERS photosensitive coatings
	*Supplied to the adhesives industry by Colton Chemical Co., Division of Air Reduction Co., Inc.	permanent types		solvent resistant	protective coatings for metal, plastics
		binders		gas impermeable	steel quenchant

Airco VINOL — a group of polyvinyl alcohol resins tailored for specific uses — offers advantages for a variety of industries. Available soon, Airco VINOL will open new possibilities for improving products and processes in such competitive fields as those listed above.

VINOL polyvinyl alcohol opens opportunities both to present users of polyvinyl alcohol and users of many competitive materials. Moderate price levels, together with the unusual versatility of VINOL polyvinyl alcohol, warrant its comparison, in many applications, with starch, casein, acrylics and other synthetic resins.

VINOL polyvinyl alcohol resins provide a wide range of characteristics such as water solubility, water resistance, adhesion to porous or non-porous surfaces, toughness, flexibility. Other key properties are resistance to grease, solvents, rotting and tearing.

VINOL grades represent a range of properties, reflecting differences in degree of hydrolysis and polymerization. However, all dissolve easily in water and form colorless solutions; all have little tendency to dust. Airco's exclusive continuous manufacturing process turns out resins of consistently high quality, free from variations often unavoidable in batch processing.

To receive the latest information about VINOL polyvinyl alcohol resins, check your interests above. We'll be glad to put your name on our mailing list to receive bulletins and samples as they become available.

AT THE FRONTIERS OF PROGRESS YOU'LL FIND..

AIRCO®

AIR REDUCTION CHEMICAL COMPANY

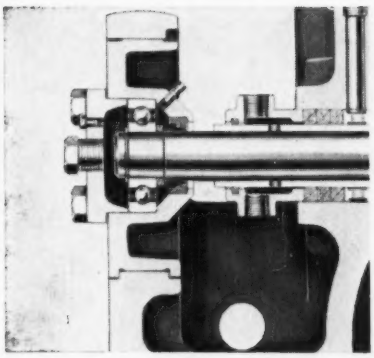
A division of Air Reduction Company, Incorporated

150 East 42nd Street, New York 17, N. Y.

Represented Internationally by Airco Company International

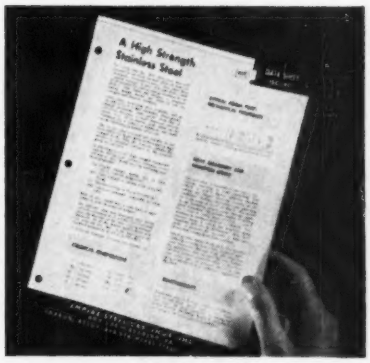
PUMPAGE

Goulds news about pumps for process industries



When life hangs by 5/1000 of an inch

Whether life is long or short depends on the proper fit of shaft to bearing. Destroy the fit by 5 to 10 thousandths of an inch—and you shorten bearing life. Therefore Goulds pump shafts are ground and polished to within the tolerances specified by bearing manufacturers. To insure complete accuracy, bearing housings are bored by a special machine. Careful handling when removing and replacing bearings in the field will also go a long way toward protecting fit and helping bearings live to a ripe old age.



Now... ISO-40 to guard against corrosion and abrasion

A stainless of great strength, ISO-40* alloy survives under some very harsh conditions. Strongly oxidizing nitric solutions don't faze it. It's a match for 50% sulfuric at r.t. It resists corrosion, abrasion, high shock. Can be furnished with a B.H.N. hardness of 320, tensile strength of 145,000 psi. A pump with an ISO-40 impeller circulated a slurry of sodium sulfite and sodium carbonate for 17 months with negligible impeller damage. Speaking of pumps, did you know you can get Goulds chemical pumps in ISO-40?

*Registered trademark of Empire Steel Castings, Inc.



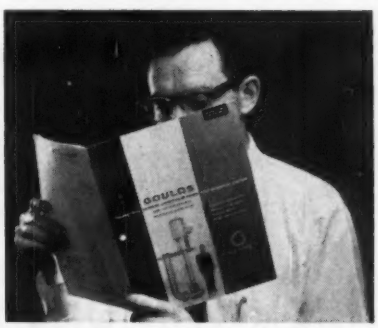
Circulating crude phthalic anhydride

One company does it with two Goulds Model 3171's. Each delivers forty gallons a minute of this sluggish solid (sp. gr. 1.2) from a depth of 11 ft. at temperatures from 300 to 525 F. How? The discharge pipe, which extends from pump through pit cover, wears a steam jacket. Temperature stays up—phthalic anhydride stays fluid. The long pipe has a 3″ expansion joint. Additional steam-jacketed pumps of other and varying lengths give flexibility to the installation. For details on how Goulds Model 3171's can help *you* move uncooperative solids, write for Bulletin 726.2.



Nuclear nomad of the seven seas

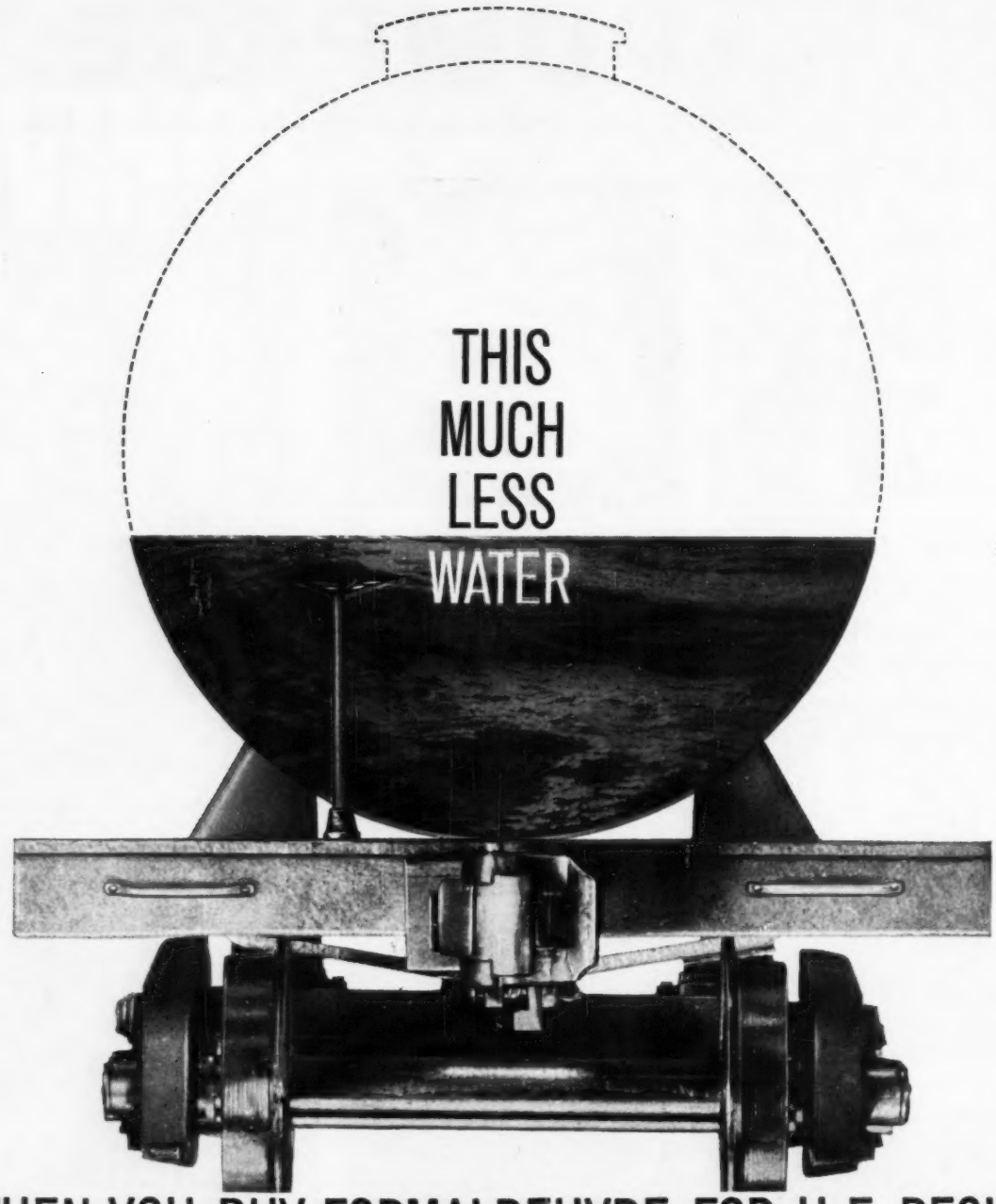
N. S. Savannah, first atomic-powered merchantman, will call at the seaports of the world as a symbol of the peaceful use of nuclear power. The 21,800-ton ship has a practically foolproof power plant. Its pressurized-water nuclear reactor uses uranium oxide fuel. Goulds Model 3655 (close-coupled centrifugal) pumps the radioactive waste water on both bilge and ballast service. The Model 3655 is available in 23 sizes with capacities to 2000 gpm, heads to 400 ft. Pump and motor are a single, compact unit, easy to install and ready to run. Standardization of parts holds down inventories. For full details, including specifications, construction information and performance charts, write for Bulletin 710.1.



NEW "king-size" vertical... capacities to 3180 gpm

Here are all the details on Goulds newest heavy-duty centrifugal sump and process pump—the "L" size Model 3171. Unit available in 316 stainless and other special alloys. Specifications, sectional views, construction materials, performance curves, dimensions—all are clearly given in Bulletin 726.2. For your copy, write Goulds Pumps, Inc., Dept. CW-100, Seneca Falls, N. Y.

GOULDS GP PUMPS



WHEN YOU BUY FORMALDEHYDE FOR U.F. RESINS

Making U. F. Resins? Allied Chemical's U. F. Concentrate-85 gives you the highest concentration of formaldehyde available in easy to handle liquid form. What's more . . . you save money five ways over urea and formaldehyde compounded separately. Here's how:

FASTER PROCESSING because there's less water to evaporate. U. F. Concentrate-85 gives you 60% formaldehyde, 25% urea, only 15% water.

LESS MATERIALS HANDLING because formaldehyde is of high concentration with urea in liquid form.

LESS KETTLE CAPACITY, LESS STEAM REQUIRED because with a higher concentration of active ingredients, you can use a smaller kettle—or produce bigger batches with existing equipment.

NO HEATED STORAGE—You don't need it even though U. F. Concentrate-85 gives you the highest concentration of formaldehyde available.

LESS STORAGE CAPACITY for a given amount of active ingredients. Water content of U. F. Concentrate-85 is a minimal 15%.

You'll find more details in Allied's 36-page brochure "U. F. Concentrate-85." Write for it.

For specifications and local offices, see our insert in Chemical Materials Catalog, pages 475-482 and in Chemical Week Buyer's Guide, pages 37-44.

Allied Chemical

NITROGEN DIVISION
Dept. ure-7-2, 40 Rector Street, New York 6, N. Y.

2819

Business
Newsletter

CHEMICAL WEEK
October 29, 1960

Look for Humble Oil Co. to create a petrochemicals complex 10 miles south of the Houston Ship Channel that may rival the big cluster of plants already on that waterway. Basis for the new buildup: strategic property.

With a narrow 473.5-acre strip of land acquired only this year, Humble has created a three-mile corridor extending from its quietly assembled 35,000-acre domain southwest of La Porte to Galveston Bay. From its newly acquired 1,600 ft. of frontage, Humble could dredge channels that would allow access to the sea. When this happens it would make possible the development of a huge industrial district that could surpass the area now served by the Houston Ship Channel.

Parallels to this setup are the development plans of Phillips Petroleum and Mobil Oil. Phillips already has an industrial district working near the Ship Channel and has attracted several polyethylene plants to its ethylene feedstock. The same thing is happening with Mobil Oil and Mobil Chemical at Beaumont, Tex.

Here's what petrochemical producers will find in Humble's district: good source of feedstocks from Humble's Baytown refinery, 12 miles north of the tract; natural gas piped into the area from Humble's new King Ranch plant; plenty of water for process use; and, of course, access to deep-water shipping.

Meanwhile, for the second time, the federal government has rejected bids on tracts in the San Jacinto Ordnance Depot grounds on the north side of the Houston channel (*CW, Aug. 13, p. 25*). The bids were again deemed too low, but the General Services Administration will probably try again.

•

These new expansions dot the CPI scene this week:

• Celanese—nation's only producer of 1,3-butylene glycol—is increasing fivefold its capacity of this plastics ingredient from present semiworks quantities to 25 million lbs./year. The plant is now under construction at Bishop, Tex., and is scheduled for completion during the first quarter of '61. The 1,3-butylene glycol—produced via a Celanese-developed process—finds primary use in plasticizers for polyvinyl chloride. Other applications: gasoline additives, printing inks, textile lubricants and dyes.

• In its fourth sodium chlorate expansion since late '54, Hooker Chemical is substantially boosting capacity at its Columbus, Miss., facility. With the most recent of these expansions concluded in early '59, the current project will be operative by early next year. Hooker has a second sodium chlorate plant at Niagara Falls, N.Y. Outlets: pulp and paper industry to make chlorine dioxide, manufacture of ammonium per-

chlorate, in weed-killers, and as an oxidizing agent in the metallurgical, textile and dyestuffs industries.

• Reflecting the heavy demand for ethical and specialty drugs is the $8-million pharmaceutical manufacturing laboratory to be completed in February by Wyeth Laboratories (Philadelphia), an affiliate of American Home Products. The 12-acre structure near Philadelphia—which will house both manufacturing and laboratory facilities as well as a national warehouse—will be one of the largest of its kind in the U. S. Wyeth, now in its centennial year, operates production and distribution centers in 21 locations in the U.S., has manufacturing labs in 20 foreign countries.

• Goodyear Tire & Rubber Co. is adding 15% capacity to its Akron, O., facilities for production of nitrile rubber and synthetic latexes. The $1.25-million expansion—to be completed in June '61—indicates that Goodyear expects nitrile to keep on holding its still small share of the total elastomer market.

•

The Manufacturing Chemists' Assn. is making a new effort to interest high school students in chemical careers—attempting this time to influence teachers and student counsellors. More than 20,000 copies of a new booklet, especially written for student advisors, have been mailed out. The booklet points out career opportunities not only in executive and technical areas for those going on to college but also in lower-echelon jobs for those who are not. An earlier MCA booklet was directed to the students, has had a distribution of nearly 1 million.

•

Britain is taking more steps to boost lagging exports. Chemical equipment producers should benefit from the decision to allow the government-controlled Export Credits Guarantee Dept. (ECGD) to guarantee credits extended by capital goods exporters for terms longer than the normal five years. But this extension will be granted only when it is considered necessary to meet terms being offered by a foreign competitor whose credit terms are being backed by its own government. ECGD will also be able to extend "part period" coverage to equipment exporters who offer longer terms at their own risk to meet terms of foreign competitors who are not backed by a credit insurance institution.

This program is aimed primarily at helping British exporters against competition from the European continent in capital-short markets such as South America and Africa. It will also give the British an advantage over U.S. equipment exporters who can't get government guarantees on individual orders for terms longer than five years. In another step, Britain is setting up a "Council for Europe"—similar to its successful Dollar Export Council—to pep up sales to the European Free Trade Assn. and the Common Market.

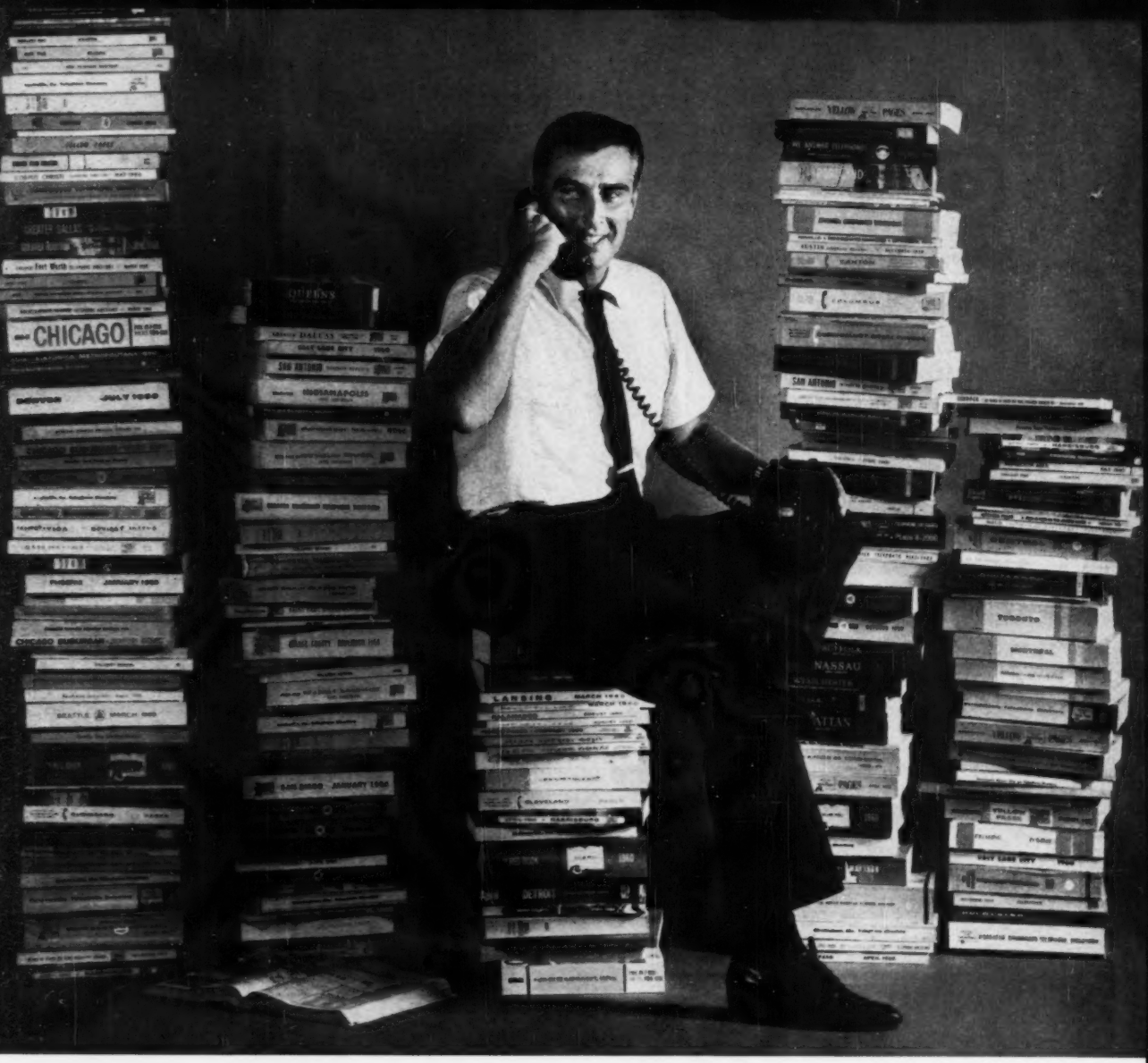
DESIGN/EXPERIENCE/CONSTRUCTION RELIABILITY/VERSATILITY

At Vitro, these are more than just words. In each Vitro project, they become realities. ■ This nitric acid unit at Nangal, India is part of a new $52 million chemical fertilizer/heavy water complex. Slated to go on stream in December 1960, Nangal will supply 85,000 tons of fixed nitrogen and 14.5 tons of heavy water per year to India's economy.
Vitro is overall technical consultant. Experienced Vitro engineers provided feasibility and layout studies, furnished architect/engineer services and today coordinate construction for Hindustan Chemicals and Fertilizers Ltd.



Vitro

VITRO ENGINEERING COMPANY/A Division of Vitro Corporation of America/NEW YORK • WASHINGTON • LOS ANGELES • TORONTO/OVERSEAS: GENEVA • MILAN • BOMBAY



BUY WORTHINGTON PUMPS LOCALLY IN 235 CITIES

Take a look in your Yellow Pages under "pumps" and see. Chances are overwhelming that you'll find a Worthington dealer there, and only a local call away. We have over 235 distributors covering nearly every trading area in the country.

So what's your advantage? One is that if you standardize on Worthington standard pumps, for locations coast-to-coast, Worthington can be a local supplier to every installation. Another is that you're dealing locally, face-to-face with men who are willing to be held responsible—and who will be there when needed.

Extremely important—you get very quick service. Remember, over 200 of these distributors stock parts—seals, bearings, packing, impellers—the kind of parts that handle 19 out of 20 emergencies. And many stock a variety of commonly used pumps.

Perhaps, however, what's of most interest to you is the seven regional Worthington assembly points. They're all F.O.B. points—even the furthest plant from a Worthington assembly point pays less than 800 miles freight . . . and you're probably much closer. From any one of these locations we can deliver more models than most other manufacturers build all together.

If you don't know who your Worthington distributor is right now—take a quick look in the Yellow Pages. We think you'll like the service you get. Worthington Corporation, Section 20-20, Harrison, N. J.

WORTHINGTON

Companies	SALES* Nine months 1960	SALES* Change from '59	EARNINGS* Nine months 1960	EARNINGS* Change from '59	PROFIT RATIOS Year-ago quarter	PROFIT RATIOS Next-to-latest quarter	PROFIT RATIOS Latest quarter
Air Reduction	$155.4	Up 2.9%	$ 11.7	Up 2.3%	7.4%	7.4%	7.4%
Allied Chemical	588.6	Up 7.7%	41.5	Up 4.6%	6.8%	8.0%	5.7%
Amer. Potash & Chem.	38.3	Down 7.3%	3.7	Down 1.6%	9.4%	10.2%	9.5%
Diamond Alkali	107.0	Up 4%	9.2	Up 10%	8.6%	9.1%	8.0%
Dow Chemical(1)	202.1	Up 5.4%	18.5	Down 17.1%	11.6%	10.3%	9.2%
Du Pont	1,629	Up 1.1%	198 (2)	Down 12.8%	13.9%	12.6%	11.7%
Eastman Kodak(3)	646.9	Up 4.0%	87.7	Up 0.2%	15.8%	13.9%	14.3%
General Tire & Rubber(4)	535.4	Up 10.7%	16.3	Down 19.9%	3.6%	2.6%	2.7%
Glidden(5)	197.5	Up 0.9%	6.7	Down 12.4%	4.8%	3.9%	4.4%
Hercules Powder(6)	249.3	Up 18.6%	20.5(2)	Up 15.5%	8.3%	8.7%	8.2%
Heyden Newport Chemical	45.6	Up 8.5%	2.7	Up 28.8%	4.9%	6.1%	5.8%
Hooker Chemical(7)	112.2	Up 0.2%	9.3	Down 7.6%	8.5%	8.8%	7.8%
Industrial Rayon	36.1	Down 25.7%	—2.4(7)	—	2.1%	(7)	(7)
Metal & Thermit	29.7	Down 2.7%	1.2	Up 3.1%	3.9%	3.7%	5.8%
Monsanto Chemical	636.6	Up 3.8%	46.5	Down 7.8%	7.6%	7.9%	6.3%
National Starch & Chemical	41.1	Up 4.8%	2.4	Up 3.2%	5.5%	5.9%	5.7%
Parke, Davis	151.3	Up 6.8%	22.5	Up 1.3%	16.7%	12.2%	14.1%
Plough	35.2	Up 38.2%	2.5	Up 25 %	8.8%	6.7%	7.4%
Richardson-Merrell(8)	40.2	Up 12.5%	6.9	Up 14.4%	16.9%	6.8%	17.2%
Rohm & Haas	168.8	Up 3.5%	17.0	Down 2.4%	10.4%	10.6%	8.9%
Sherwin-Williams(5)	282.3	Up 2.5%	16.0	Down 8.6%	(Not reported)		
Texas Gulf Sulphur	44.8	Down 8.0%	9.6	Down 1.2%	17.3%	21.3%	21.9%
Union Carbide	1,157.5	Up 3.3%	117.4	Down 7.5%	10.1%	10.4%	9.4%

*Dollar figures in millions. (1) For three months ended Aug. 31. (2) Net operating income, including CW estimate for third quarter. (3) For 36 weeks ended Sept. 4. (4) For nine months ended Aug. 31. (5) For fiscal year ended Aug. 31. (6) Including Imperial Color & Chemical results for second and third quarters of '60. (7) Net loss. (8) Formerly Vick Chemical—for three months ended Sept. 30.

Chemicals Write Enviable Record

By and large, the nation's chemical industry is flourishing and is holding up better than most other industries, to judge from third-quarter financial statements out this week. Corporate sales are hitting new records, ranging up to more than 15% higher than last year's peaks; and chemical companies' earnings continue to run well above the average returns for all manufacturing lines.

But a more somber aspect of the industry's year-end outlook is seen in the increasingly serious effects of trends that have been weighing on the whole economy: (1) a flattening out of sales curves; and (2) a drop in earnings, despite the relatively steady sales pace.

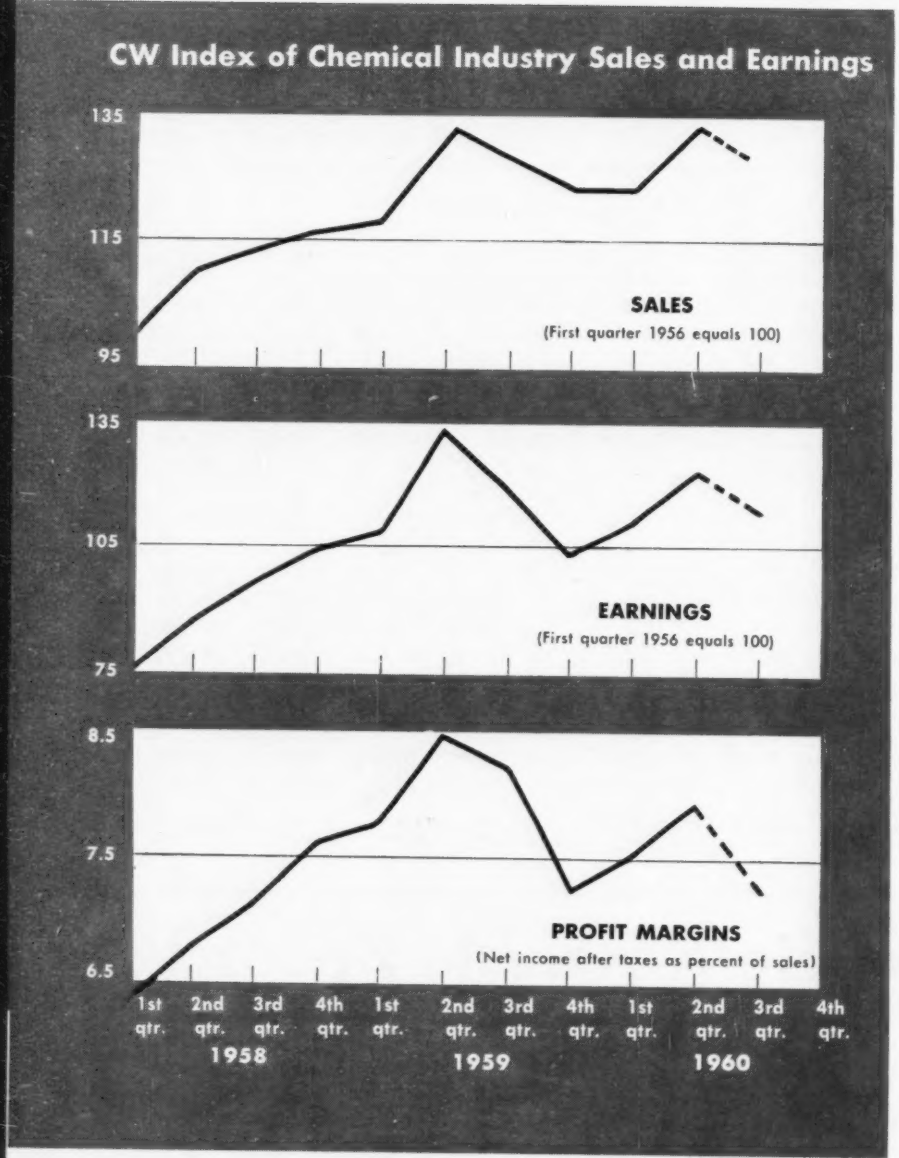
Among leading chemical producers, there are several enviable exceptions to both of these trends (*table, above*). But for the industry as whole, current performance tends to follow the general pattern for all U.S. business (*charts, p. 22*).

New Highs in Sales: Nearly every chemical company heard from to date has posted a new record for its January-to-September sales volume. This is particularly impressive in view of the fact that last year's first six months were an exceptional boom period, with virtually all manufacturing operations abnormally stimulated in the frenzy to accelerate producing and sales before the anticipated steel strike that took hold in July '59.

Most of the reporting chemical companies are also ahead of last year on third-quarter sales; but this is not so remarkable, as third-quarter results in '59 were inhibited by the steel and copper industry strikes.

So far, the biggest single gain in nine-month sales is the 18.6% increase recorded by Hercules Powder, which has been cashing in on various expansion programs — including its moves to bolster its position in the growing field of rockets and propellants (*CW, Aug. 27, p. 49*). Other notable advances in sales: the 8.5% rise scored by Heyden Newport, which —like Hercules—has been benefiting from the sellers' market in rosin and related products; and the 7.7% increase in revenues from Allied Chemical's broadly diversified operations.

Bucking the Profit Squeeze: These same three producers also have come up with the best profit showings to date. Outstanding in this respect is Heyden Newport's 28.8% improvement in nine-month earnings, reflecting the economies of a higher rate of operation (relative to capacity) and a stronger tone in product prices. Hercules, starting from a considerably larger base, turned in a 15.5% gain in net income. Allied's earnings were up nearly 5%; Chairman Kerby Fisk



noted that much of the company's increase in third-quarter sales stemmed from a rise in the company's coke-oven construction business, "on which profits are lower than on other lines."

But while about half of the reporting companies are ahead of last year in nine-month earnings, the profit picture for the quarter just completed is several shades darker. Allied, for example, tells of a 4.6% rise in nine-month earnings, but third-quarter net income was down nearly 10%. The industry's bellwether, Du Pont, is 12.8% behind on nine-month operating profits, relative to last year, but suffered an estimated 18% setback in third-quarter earnings.

But there are some exceptions to the pattern of a rough third quarter. One of these: Union Carbide is 7.5% behind last year in nine-month earnings, but its third-quarter net was off by less than 1%. This provides additional perspective on the profit squeeze that has become such a prominent characteristic of business in '60. In order to hold earnings to within 1% of the year-ago level, Carbide had to boost sales volume by more than $25 million—nearly 7%.

In nearly every case, profit margins have tumbled during the past year. Even the pharmaceutical companies—under criticism from some quarters for allegedly noncompetitive pricing policies—were not immune to this trend. Parke, Davis, for instance, points to a more than 15% shrinkage in rate of return on net sales; third-quarter earnings were down 13%.

In its fiscal year ended Aug. 31 Glidden achieved record Paint Division sales, up from $88.7 million to $89.9 million; but Chemical Division sales slipped from $28.8 million to $28.1 million.

Eastman's over-all chemical and plastics sales were up in the nine months to Sept. 4.

Two other producers of cellulosic fibers had setbacks. American Viscose's nine-month sales and earnings slipped 11% and 36%, respectively; and Industrial Rayon sustained another net loss.

Despite these bearish factors, chemical management remains basically optimistic—particularly for the longer haul. Carbide Chairman Morse Dial emphasizes that his company is continuing policies that will contribute to long-term growth—such as increasing expenditures for research and development, taking maximum depreciation set-asides, and boosting capital outlays from last year's $136 million to more than $200 million in '60—"even though these policies may have a temporary depressing effect on earnings."

Urea Tower Topples

Last week Mississippi Chemical Co. resumed urea production at its Yazoo City, Miss., plant, but was still stumped as to what caused the collapse of its 100-ft. urea prilling tower several weeks ago.

Although the 14-month-old tower was completely wrecked and the urea finishing and packaging building nearby sustained extensive damage, the compression and synthesis units at the plant escaped with only minor damage. Mississippi Chemical is investigating the accident, says it still has no clue. Since the tower was being cleaned out at the time, no prilling was going on when it fell.

Of the four men hurt in the collapse, two were working on the tower at the time and fell to the ground with it. All four are now back on the job. Total damage to the plant; about $500,000.

Canada's Profit Woes

At their meeting last week in Montreal, members of Commercial Chemical Development Assn. (New York) asked: "Is it realistic for Canada to have a chemical industry at all?" Replied members of Chemical Institute of Canada: "Yes, but not the way we are going about it now."

Some 350 members (one-third U.S., two-thirds Canadian) of the two industry groups attending a joint all-day session in Montreal's modern Queen Elizabeth Hotel focused mainly on the plight of Canadian companies.

The profit pinch and other problems of the U.S. chemical industry seem to be amplified above the border. Although the value of the Canadian chemical industry's plant has more than doubled in the past eight years, total dollar profits before taxes are about the same.

At the CCDA-CIC meeting, many wondered if Canada is best suited only for primary processing of chemical materials, rather than for chemical end-products—which are in bountiful oversupply. "There is one advantage, of course, to this situation," said F. P. Wilson, executive vice-president, Union Carbide of Canada Ltd., and one of the Canadian industry's defenders at the meeting. "It certainly provides competition."

The primary-vs.-secondary question seems sure to come to a head in the proposed Foothills Pipe Line from Alberta oil fields to Chicago (*CW, Oct. 22, p. 27*). Although more distant than Texas, the Alberta oil fields are being talked about as the foundation of a new petrochemical industry in the Great Lakes area. A $100-million complex is in the planning stage now. Canadian petrochemical producers have already begun to protest.

Canadian chemical people concede that they have problems, but maintain that a secondary industry will be successful; it's only a matter of time, they add. This, mainly, is how they say the time will be employed:

- Improving research. Canada has a largely untapped pool of technological talent that could be used in developing new products. Although development costs as much per product in Canada as anywhere, and the market seldom justifies it, some Canadians believe they can export technology through products. But significantly, Canadian firms now spend only about half as much on research—as a percentage of sales—as U.S. firms do.
- Devising more realistic plant engineering. Rather than building scaled-down versions of U.S. plants, innovations tailored to the smaller market are hoped for—particularly in the area of more versatile multiple-product facilities.
- Revising tariffs. Although many Canadians feel something akin to a common market with the U.S. would be desirable, most—for political and nationalistic reasons—want higher tariff walls (*see also p. 5*). They'll probably have them within three years.

CIC speakers agreed: Canada is determined to have its own industry.



Carbide's Wilson: 'The situation . . . certainly provides competition.'

Money to Grow on

Texas Butadiene & Chemical Corp. (New York) has asked the Securities & Exchange Commission's permission to offer 635,800 shares of common stock to the public. Big part of the proceeds from the sale will go to finance a portion of the estimated $5.5-million investments to be made in France and Argentina by wholly owned subsidiary Texas Butadiene & Chemical International. Also, $700,000 will be used to buy 5,570 shares of TBCC preferred stock from The Fluor Corp.

Societe des Elastomeres de Synthese (in which TBCI holds a 30% interest) is building a 50,000-metric tons/year synthetic rubber plant near Marseilles, France, that is now scheduled for completion in May '61. When it is finished, TBIC will construct a 35,000-metric tons/year butadiene plant to supply its raw materials. The butadiene unit is targeted for a late '63 startup; until then, butadiene will be shipped from the U.S.

South American Two-Step: A two-phase Argentine project includes a 40,000-metric tons/year synthetic rubber plant and a carbon black plant in the first phase. Two years after their completion, a butadiene plant with initial capacity of 30,000 metric tons/year will be built.

The carbon black plant will be built, owned and operated by Cabot Corp., which owns 43% of TBCC stock. Final Argentine government approval is pending, subject to completion of necessary financial arrangements.

The parent company—producer of butadiene, aviation gasoline and rubber—has never paid dividends on its common stock and intends to continue to plow earnings back into the business. First-eight-month sales this year are up 11.7%, to $30.5 million; earnings are up 22%, to $4.4 million. In '59 total sales were $42.2 million vs. earnings of $3.4 million.

Hedging a U.S. Bet

Seeing above-average growth potential in European chemicals, Chemical Fund (New York) has invested $6.8 million (2.7% of its total investments) in Common Market chemical companies, including Badische Anilin- & Soda-Fabrik, Farbenfabriken Bayer, Unilever N.V., and Saint Gobain.

The fund's officers feel that these companies are serving a relatively untapped chemical market, are particularly heavy in exports, and should grow faster for a while than most U.S. companies (although it notes that U.S. companies are also heavy in international business).

The fund is interested in Germany, Italy, France and the Netherlands. An English company would have to look "very good" because of England's 38% dividend tax. France, like England, has an economy "which is beginning to look spotty," but France's raw-material position (Algerian oil, natural gas from Lacq) is attractive. Next area for the fund's attention: Japan.

TVA Fertilizer Operations

Products	Shipments (tons) 1958-59	1959-60	Sales Price[1] (per ton)	Cost of Product[1] (per ton)
Ammonia	51	2,525	$53.23	$44.57
Ammonium nitrate	86,218	74,665	55.93	45.54
Ammon. phosphate nitrate	11,913	25,787	59.22	56.33
Ammon. nitrate sulfate	(2)	6,090	53.91	45.87
Calcium metaphosphate	78,521	75,753	67.13	71.65
Diammonium phosphate	23,174	24,999	95.51	102.17
Granular fertilizer (experimental)	3,101	747	56.06	46.38
Leached-zone fertilizer	(2)	1,107	61.43	126.94
Liquid fertilizer	(2)	9,079	57.91	59.24
Nitric acid	4,395	9,826	28.75	24.75
Superphosphate (high-analysis)	33,000	30,435	55.10	69.68
Superphosphoric acid	1,974	2,626	107.05	99.85
Other materials	5,316	—	—	—
Total shipments	247,884	263,639		

(1) Dollar figures are averages for each product's various grades, such as bulk and bagged.
(2) Output in 1958-59 included in "other materials."

TVA Tallies Chemical Score

Tennessee Valley Authority has added up its chemical accomplishments during the fiscal year ended last June 30: It spent $4.9 million developing fertilizers and related chemicals compared with $5.9 million in fiscal '59.

The money was split up this way: $1.9 million for research, $900,000 for farm test demonstrations, $400,000 for basic agronomic research, and $200,000 for other agricultural development activities. TVA made 264,000 tons of fertilizer, sold 250,000 tons (the rest was used in farm demonstration programs).

Lowered losses: On $15.5 million of fertilizer and munitions products sales, TVA lost $36,390. In '59 the loss was $1.3 million. This is the most significant single cut in expenses.

Although the authority's financial statement indicates sharp increases in research expenditures on processes for nitrogen (from '59's $26,000 to '60's $70,000) and phosphorus (from '59's $84,000 to '60's $169,000) fertilizers, this, TVA officials say, simply represents an administrative reorganization, not a change in emphasis.

Being studied: more slowly soluble nitrogen fertilizers (to solve the leaching problem), and fertilizers with better handling characteristics (particularly a solution of the moisture absorption problem).

During fiscal '60 TVA issued 37 licenses to industry for use of fertilizer developments.

Pipeline Progress

The proposed $225-million Texas-to-southern California-via-Mexico pipeline project of Tennessee Gas Transmission Co. and Mexican oil agency Pemex received both a boost and a brickbat last week.

Humble Oil signed up to deliver some 1.8 trillion cu.ft. of natural gas over a 20-year period. Deliveries would rise to a maximum of 265 million cu.ft. daily in the fifth year from a first-year rate of 108 million cu.ft./day. Pemex will supply 75 million cu.ft./day, leaving 115 million cu. ft./day yet to be contracted.

An attack on the proposed 1,800-mile line came from Mills Cox, president of the just-opened Transwestern Pipeline Co., which, along with El Paso Natural Gas, now supplies gas to the same southern California area. Cox made a double charge. He termed the project economically unfeasible and predicted that it would fail to gain necessary federal and state authorizations. He feels that the southern California market cannot, even now, absorb all of the gas available.

"When and if the capacity of pipeline facilities now serving the southern California gas market has been reached," said Cox, "that will be the time to consider the feasibility of the proposed project."

So far Tennessee Gas and Pemex aren't worried about getting customers for the pipeline—tabbed the "Enchilada Line." Last month an agreement was signed with Southern California Edison Co., assuring the line of a buyer for up to 455 million cu.ft./day—full capacity—of the natural gas.

Chlorocarbon Rematch

For the second time Stauffer is faced with patent infringement charges by Dow over processes for manufacturing perchlorethylene, carbon tetrachloride and tetrachlorethylene. Dow had brought similar charges once before, but they were dropped after Stauffer denied them. Since that time Stauffer had expanded its Louisville, Ky., chlorinated solvents plant.

This time Stauffer has countered Dow's complaint with a charge of restraint of trade as well as a denial of infringement. It claims, too, that the information that was patented by Dow was in the public domain prior to the patent application. The Dow specifications are called ambiguous, misleading, vague and repetitious, and Stauffer says the patents are both invalid and unenforceable.

Enlisting Aid? Dow is asking for an injunction and recovery of triple profits and damages. The rest of the chlorinated hydrocarbons industry could be faced with a similar threat if Dow should win the case. On these grounds, Stauffer is reportedly enlisting the support of other chlorinated hydrocarbons producers. So far, however, little is being said publicly, since apparently neither side wants to jeopardize chances of an out-of-court settlement.

The Blocs Stay Split

Recent developments make it clear that the gulf between Europe's two trading blocs is as wide as ever—unsettling news for U.S. chemical companies that are waiting for a resolution of the split before they decide where to build their European plants.

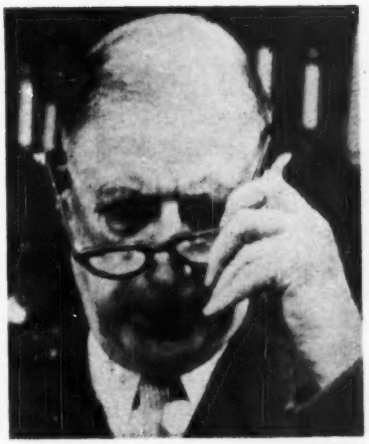
The big stumbling block in bringing together the European Economic Community (the Common Market) and the European Free Trade Assn. is France's President Charles de Gaulle and his plans for a European "third force"—i.e., establishing Europe as a power bloc independent of the U.S., and led by France.

When De Gaulle outlined his plans to West German Chancellor Konrad Adenauer in August, he seemed to have inadvertently created a new impetus for bringing together the two blocs (*CW, Aug. 27, p. 41*). Adenauer was alarmed over the threat De Gaulle's plan posed to NATO. He promptly met with Britain's Prime Minister Harold Macmillan, whose government was becoming increasingly concerned over the European trade rift.

While the main portion of their conference was probably devoted to the problem of maintaining Western Europe's political and military unity within NATO, publicity emphasis was put on their agreement to press anew for some way to bring the trading blocs together.

In the Freezer: But in the flurry of diplomatic *tete a tetes* that followed, the flush of optimism over the prospective bridge has gradually paled. It has become clear that De Gaulle will not allow Britain into his club unless he can write the rules. And since his Common Market partners, as well as Britain, will not accept these rules, the prospects for bringing the groups together very soon are dim.

Meanwhile, other developments have made it clear that a union of the trade blocs was further away than many had thought. At last month's meeting of the Commonwealth finance ministers in London, Britain was surprised by the force with which some of its partners (particularly Canada and New Zealand) vented their concern over the consequences a British agreement in Europe might have on their preferential trade relationships with the U.K.



WIDE WORLD

De Gaulle's 'third force' plans have stalled European merger moves.

And earlier this month resistance to Britain's entering EEC cropped up in another quarter — its partners in EFTA, who fear being left out in the cold by Britain or having to raise their tariffs to Common Market levels in the process of uniting.

These fears were voiced at the EFTA ministers meeting in Bern. The largely negative conclusions of the meeting were further evidence that European trade unity is not just around the corner. The meeting revealed that the EFTA members had come to think of themselves as a positive trade force, not just a defensive device against the Common Market. The ministers decided not to match the Common Market's accelerated tariff adjustments by revising their own schedule — which was originally designed to match the Common Market's in order to facilitate union. And they resolved that any new move toward bringing the blocs together must come from EEC.

But the fears of Britain's partners in the Commonwealth and EFTA are problems that can probably be resolved once the big stumbling block—the opposition of De Gaulle—to ending the split is removed. Nothing on this score is likely to happen until the present confusion in the Atlantic alliance is resolved in some kind of showdown. This may take place when Common Market members hold a summit meeting in December. Still, whatever happens after that will depend in large measure on the reactions of De Gaulle.

Washington, meanwhile, views the situation with mixed feelings. While it is, of course, deeply worried over the turmoil in the Atlantic alliance, those officials who are concerned about maintaining our exports find encouragement in the likelihood that the European trade blocs will not soon come together. That, they fear, would mean more discrimination against U.S. exports. While the split remains, they believe, the two blocs will have to minimize its damaging effects by bargaining down their tariffs against outsiders — including the U.S.

Castro's Chemical Woe

Chemicals will be among the commodities most affected by the Administration's decision last week to cut back already-dwindling U.S. exports to Cuba.

For months Premier Fidel Castro has been deliberately moving to reduce Cuba's economic dependence on the U.S., shifting it to the Communist bloc. But he has continued to buy selectively from the U.S. the specialized items he needs most and which he cannot easily get from other nations.

For example, Cuba has dipped into its dwindling dollar reserves to pay cash for such items as catalytic gel to keep its oil refineries running, for pharmaceuticals, spare parts for industrial equipment, machinery and some food products.

Official statistics for the first six months of '60 underscore this trend. Compared with first-half '59, total U.S. exports to Cuba were slashed from $208 million to $142 million. But chemicals and related products exports dropped only fractionally, from $21 million to $20 million, while shipments of medicinals and pharmaceuticals actually rose, from $5.3 million to $5.6 million.

Pharmaceuticals and medicinals, medical supplies and unsubsidized food items have been specifically exempted from the ban for diplomatic and humanitarian reasons.

How effective the new curb will be depends on how readily Castro can get these items elsewhere. U.S. officials are frankly uncertain on how successful he will be. Cuba will probably be able to stave off industrial or general economic collapse for at least a few months, but many U.S. government experts doubt that either the Western nations or the Communist bloc sources can fill its needs indefinitely.

COMPANIES

Sun Chemical Corp. (New York) is organizing a new Chemical Coatings Division comprising operating units that produce and sell protective and decorative coating materials. Carl Bauer, former president of Standard-Toch Co. (New York), will head the new division.

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Patterson Foundry & Machine Co. (East Liverpool, O.), chemical equipment manufacturer, has reacquired its former subsidiary, Patterson Foundry & Machine Co. of Canada, Ltd. (Toronto, Ont.) from Ferro Corp. When Ferro sold Patterson a year ago, the Canadian operation was not included.

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Fluorocarbon Co. (Anaheim, Calif.) has purchased the assets of the fluorocarbon plastics division of Raco Engineering Co. (Santa Monica, Calif.). Acquisition of this division, which will be moved to Fluorocarbon's new plant at Anaheim, includes equipment, tooling and personnel.

•

Belding Heminway Co. (New York), whose Belding-Corticelli subsidiary is said to be the world's only producer of nylon 8, is merging with Lily Mills Co. (Shelby, N. C.). As a wholly owned subsidiary, Lily will continue operations, retaining its name and management.

EXPANSION

Soda Ash: Stauffer Chemical Co. (New York) has started construction of its trona mine and mill project near Green River, Wyo. (*CW, Oct. 8, p. 42*). Work has begun on a refining plant and bids have gone out for construction of a 10-mile railroad connecting with Union Pacific's main line west of the area. Initial capacity of the project: 150,000-200,000 tons/year.

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Gypsum: Crystal Creek Gypsum Co. (Lovell, Wyo.) will transfer 67 gypsum claims along the Big Horn River near Lovell to a corporation being formed to develop the claims and build a $5-million processing plant. The transfer requires stockholders' approval, but directors backing the transaction own 75% of the stock.

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Magnesia Refractories: Refractories Engineering & Supplies Ltd. (Montreal, Que.), affiliate of Kaiser Aluminum & Chemical Corp.'s Refractories & Chemicals Division, will build a facility at Bronte, Ont., to produce high-magnesia basic refractory mixes. Operation will begin early next year.

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Asbestos: Canadian Johns-Manville Co. (Port Credit, Ont.) will provide almost half of an $18-million investment by four international companies to develop asbestos ore in northern Newfoundland. Mine site facilities will include an asbestos fiber mill, crusher building, dry rock storage, warehouse for fiber, and a service building. J-M says the mill will be ready for year-around production in mid-'63.

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Phthalic Anhydride: Monsanto Chemical Co. has awarded a contract for design, engineering and construction of a phthalic anhydride plant in Gloucester County, New Jersey (*CW, Sept. 10, p. 32*), to Badger Manufacturing Co. (Cambridge, Mass.). This will be Badger's sixth current fluid-bed phthalic anhydride project and will increase Monsanto's phthalic capacity by 30%. Plant completion date: early '62.

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Refractory Metals: Chemical and Metallurgical Division of Sylvania Electric Products (New York) says the 6,500-sq. ft. addition to its refractory metals processing plant in Towanda, Pa., will double its production capacity for tungsten and molybdenum sintered products. The new project will be onstream late this year.

FOREIGN

Pharmaceuticals/China: Two state-owned plants in Communist China are offering two new drugs (for China) in Hong Kong: a vitamin B_{12} growth-promoting agent for livestock, and coprylic acid bisulfide for treatment of hepatitis.

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Petrochemicals/Switzerland: U.S. Industrial Chemicals Co. International—a branch of National Distillers and Chemical Corp. (New York)—has started work on a new technical service laboratory and sales office in Baar. The laboratory is designed for polyethylene research.

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Ammonia/Israel: Fertilizers & Chemicals Ltd. (Haifa) has concluded a deal with a Greek fertilizer concern to build a $1-million ammonia storage facility. As part of the contract, the Israeli firm will provide aqua ammonia during the construction period and anhydrous ammonia after completion of the project.

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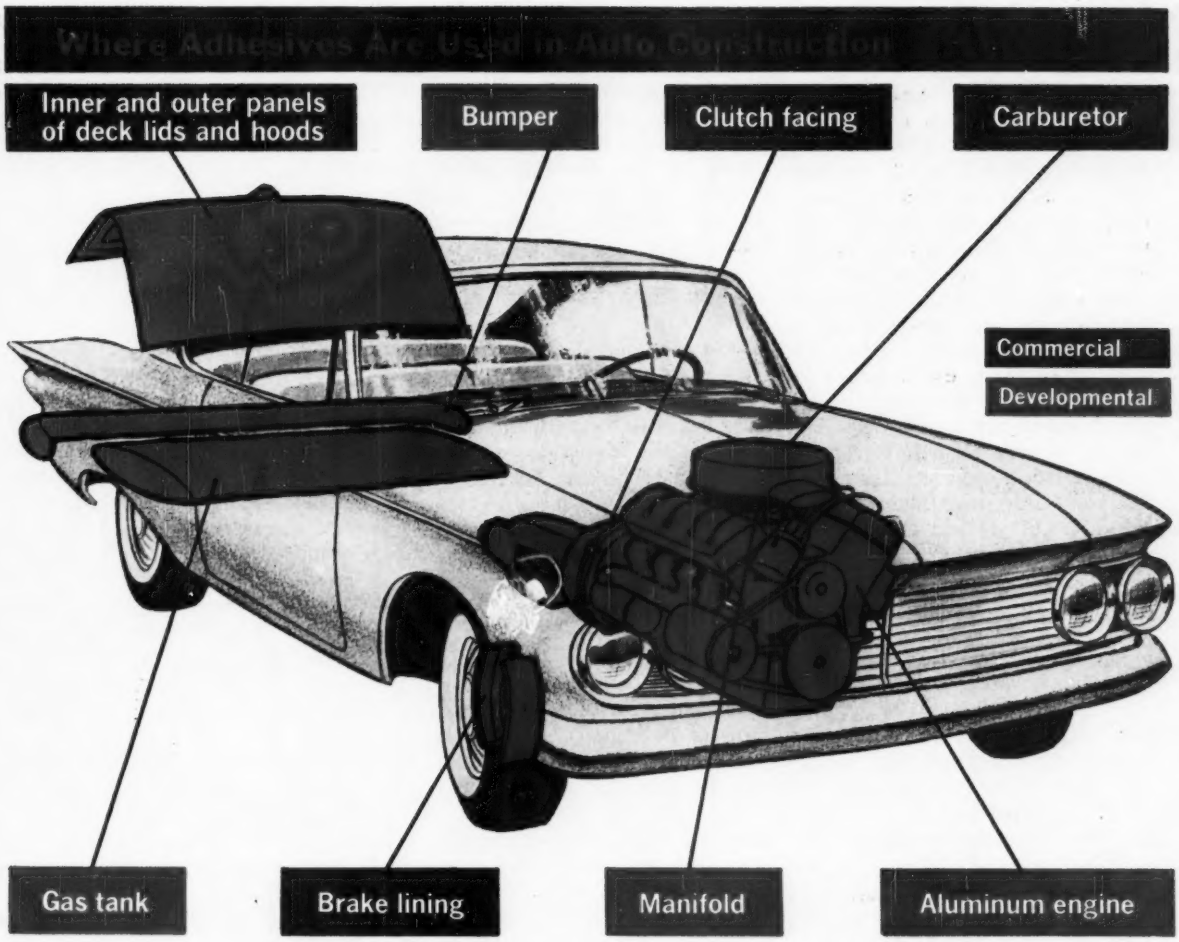
Ammonium Sulfate/Pakistan: Another ammonium sulfate fertilizer factory will go up near Sukkur on the Indus River, according to Pakistan Industrial Development Corp., which drew up the plans. Plant capacity: 250,000 tons/year.

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Chemicals/India: The four-unit Trombay fertilizer factory, slated to produce ammonia and nitric acid, urea and nitrophosphate fertilizer, will get U.S. financial backing. Entire cost, $58 million, will come from the Development Loan Fund and will be the 21st DLF loan to India.

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Chemicals/Switzerland: Du Pont de Nemours International, S.A., will establish a plastics design laboratory in Geneva. Purpose: to help European manufacturers develop new applications for Du Pont plastics.



Adhesives: Hidden Plus in the New Models

Adhesives are a hidden plus in '61 autos debuting this month. And auto makers tell Chemical Week that future models will use even more chemical bonding of metals to chop costs, reduce noise and stave off electrolytic corrosion.

Completely "glued" cars aren't in the offing, but adhesives are progressively displacing rivets, welds and hardware (e.g., lock washers), research executives of General Motors, Ford and Chrysler agree. But the reason for their limited use of glue now is that resin bonding is slower than welding. Auto makers' immediate goal is more use of metal-to-metal adhesives to deaden noise. "Hershey drops" of epoxy adhesives are now used to supplement welds between the inner and outer panels of automotive hoods and deck lids. Soon this adhesive family may secure crimped joints of these panels. Big advantage: elimination of the need to buff off weld dimples.

What's the most promising adhesive? Opinions differ. Ford favors epoxies, but hasn't settled on a specific type. Chrysler's Cycleweld Division likes neoprene's prospects. GM, doing most of its research at its Technical Center, hasn't backed any particular type of material.

In either case, the criteria for a good adhesive, as given by Cycleweld's Sumner Twiss still hold: it must be curable in paint ovens (but have sufficient adhesion to hold the parts together prior to curing); it must be able to penetrate and bond through dirty (oily) surface and/or treated (e.g., bonderized) surfaces; it must have a long pot-life—a trait that is unfortunately not usually compatible with a short cure-time; and, so far not attained, it must be able to achieve a structural bond between a 0.050-in. separation. This latter is not an abnormal tolerance between mating body panels. These panels can be forced together and welded, but an adhesive similarly forced is under tension that detracts from its bond strength.

Twiss notes that neoprene's successes as an adhesive invariably involved 100% solids material. This form eliminates problems of solvent evaporation and provides the high

viscosities necessary. It is also curable in a paint oven (separate curing would be prohibitive in cost), and shrinks less than solvent-containing adhesives.

Less Stress: Ford Research Director Judd Forrester sees a continuous adhesive bond as a potentially big improvement over currently used periodic welds. Reason: adhesives would introduce less localized stress into the metal (allowing the metal to handle more load) and could be used on visible areas. Like Ford, Chrysler uses the "Hershey drop" method for both hood and deck lids. And GM's Corvair, for example, uses adhesive in this fashion in its rear-engine cover. All three companies are about ready to apply the principle to the bonding of roofs to metal-supporting struts.

Block Binder: Doehler-Jarvis Division of National Lead Co. (Toledo, O.), supplier of die-cast, six-cylinder aluminum blocks to American Motors, is actively researching a two-piece aluminum head that would be bonded in the middle. Epoxy adhesives are favored, but no single compound has been picked. Problems abound: the joint must withstand heat, pressure, exhaust gases, water, and water mixed with antifreeze.

Cycleweld has conducted numerous tests for single-cylinder-engine manufacturers and has found that no existing adhesive will last on thin block sections for more than 100 hours. Therefore, Doehler-Jarvis may be forced to turn to a one-piece head.

Aircraft Analogy: The wide success of adhesives in the construction of certain aircraft hasn't been duplicated in auto making, mainly because adhesives require more time than does welding. Slowing down the production line is an expense that precludes, at present, broad use of adhesives to substitute for welds and rivets.

But research may overcome this. Industry opinion is that a moving line with many applicator guns will be the best way to apply structural adhesives. An alternative method would be to move a panel under a stationary gun, a procedure applicable only at the stamping-plant level.

Outsiders' Role: Chemical companies, of course, have a major stake in the expanding use of auto adhesives. Leaders in the field—such as Minnesota Mining, B. F. Goodrich and Borden Chemical—outlined their work to CHEMICAL WEEK.

Borden is doing a lot of work on self-curing or surface-catalyzed monomers for steel and aluminum. The approaches include:

(1) Preparation of liquid monomers that are catalyzed to resinous adhesives by the moisture present on metallic surfaces. These are reportedly fast-curing bonds having moderate strength.

(2) Preparation of monomers that polymerize by chelating with the metal surface. Many monomers capable of forming high-melting chelate polymers have been prepared.

(3) Preparation of monomers that are catalyzed to polymeric adhesives by the reducing action of metals.

Minnesota Mining has been working with epoxy systems and nitrile-phenolic combinations, believes that greater use of nonferrous materials in automobiles will mean more use of structural adhesives. Farley Thompson and Albert Martin, 3M adhesives researchers, said at a Society of Automotive Engineers meeting earlier this year: "The use of adhesives permits the use of lighter-gauge metals since the load can be spread over a larger joining area. Adhesives also provide the means of joining dissimilar metals without the hazard of galvanic action." (Electrolytic corrosion of bumpers, for example, might be eliminated by using adhesives in mounting them.)

One of the things that should not be overlooked, they said: joining with adhesives forms a seal as well as a bond. "Think of the headaches that will be eliminated when it is no longer necessary to gunk up the drip rail and the trunk gutter with sealer. This can be extended to the cowl and floor seams. No more asphalt to track all over the shop. This is a reality not too far in the future. Exterior coach joining problems will become a thing of the past."

A spokesman for B. F. Goodrich points out that even at the production rate of 6.5 million cars/year, the auto industry doesn't now consume much adhesive. Figuring 2 to 3 lbs. of solids per gallon, 1 gal. of conventional adhesive (e.g., it offers a phenolic modified rubber) covers about 250 sq.ft. That takes care of a lot of cars, in brake bonding, for example. It's true that in at least one special case, Chevrolet's Corvette, about 40 lbs. of adhesive are required for each car.

In the case of the polyester-type lock nut sealants used in the assembly of carburetors, the per-car usage is tiny. But it still is a sizable business for companies such as American Sealant (Hartford, Conn.), maker of Loctite.

And adhesive makers will happily settle for a market of a few pounds of adhesive per conventional metal car in the near future. Research, they believe, is achieving realization of that goal, opening the way to much greater usage.

Photographic Speed-Up

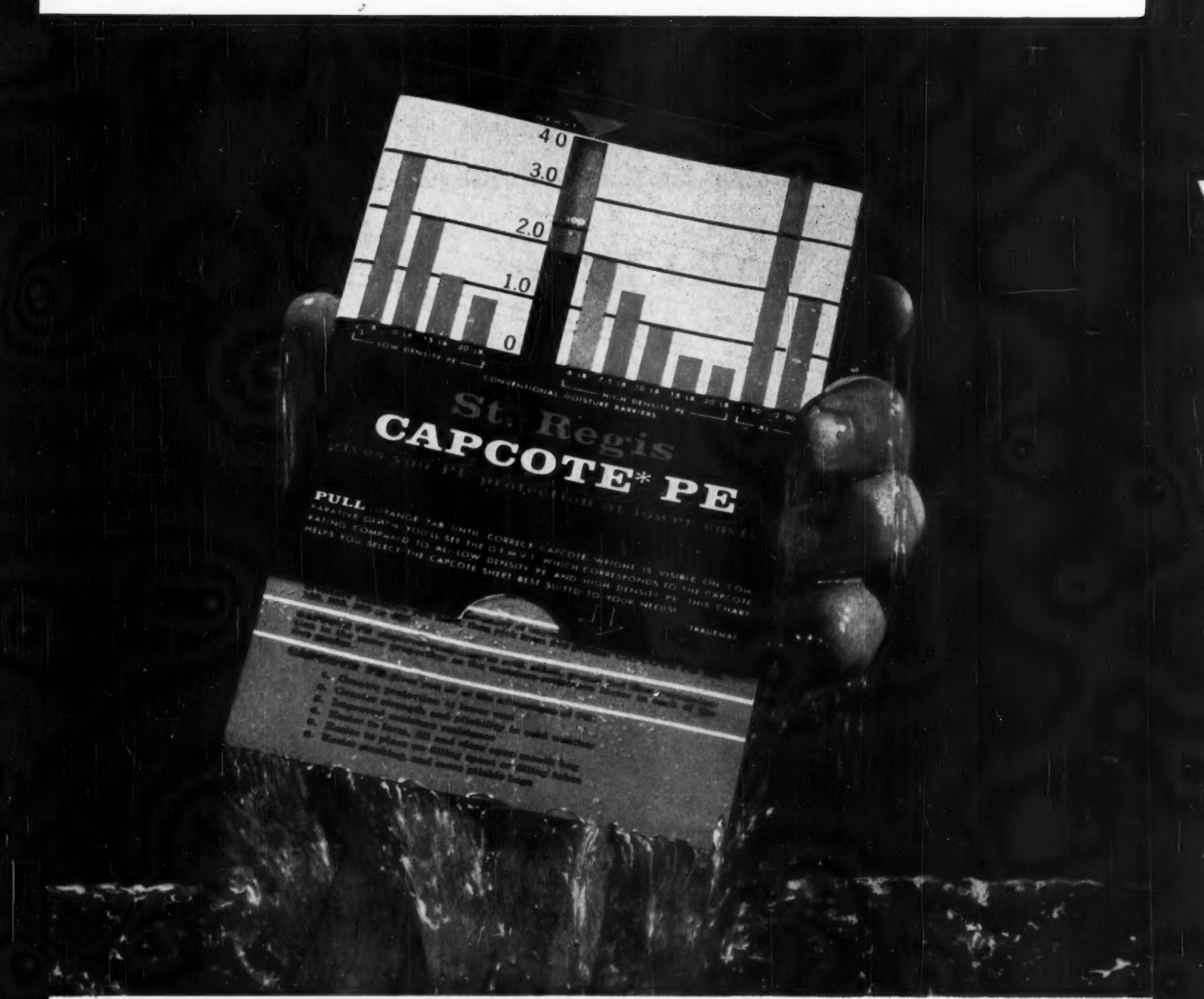
These major trends were evident to observers at the Society of Photographic Scientists and Engineers' recent symposium on high-speed photographic research in Washington: growth of the "systems approach" in designing processing systems; cutting out the fixing step by combining it with developing or replacing it with a more efficient stabilizing method; and increasing emphasis on dry techniques.

Design of photographic processing systems is moving away from the step-by-step approach and turning into a closer blend of chemical and electromechanical aspects (i.e., greater automation).

The fixing step is one of the process bottlenecks that are getting most attention. Conventional fixing involves treatment of the developed film with "hypo," followed by washing. One way to cut down on the time required is to perform the developing and fixing operations simultaneously by use of "monobaths" (some of which are on the market).

Another way to get around conventional fixing and washing is to use a stabilizing agent that doesn't have to be washed after acting. Examples are thioureas that form a light-stable complex with the silver halide salts, thus allowing the silver salts to remain in the developed film without danger of further exposure.

Systems that eliminate wet processing altogether are being looked to for greatest future development, however. Improvements on electrostatic techniques are one route. Another is development of new chemical reactions that give useful images.



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RESEARCH

New Disease Fighters

Eight new antibacterials got top billing at this week's Conference on Antimicrobial Agents in Washington, successor to the annual antibiotics symposia. About 125 papers were read at the meeting, which attracted 500 scientists from all over the world.

Some of the antifungal or antibiotic agents discussed have been checked out only in glassware studies, others already have a solid commerical footing. But this year the research that was disclosed shared center stage with the revamped meeting itself.

The new conference is sponsored by the Society for Industrial Microbiology, a nonprofit "learned society" of scientists and engineers. The 600 members are drawn from drug manufacturing firms, rubber and petroleum industries, the Food & Drug Administration of the U.S. Agriculture Dept., universities and other organizations.

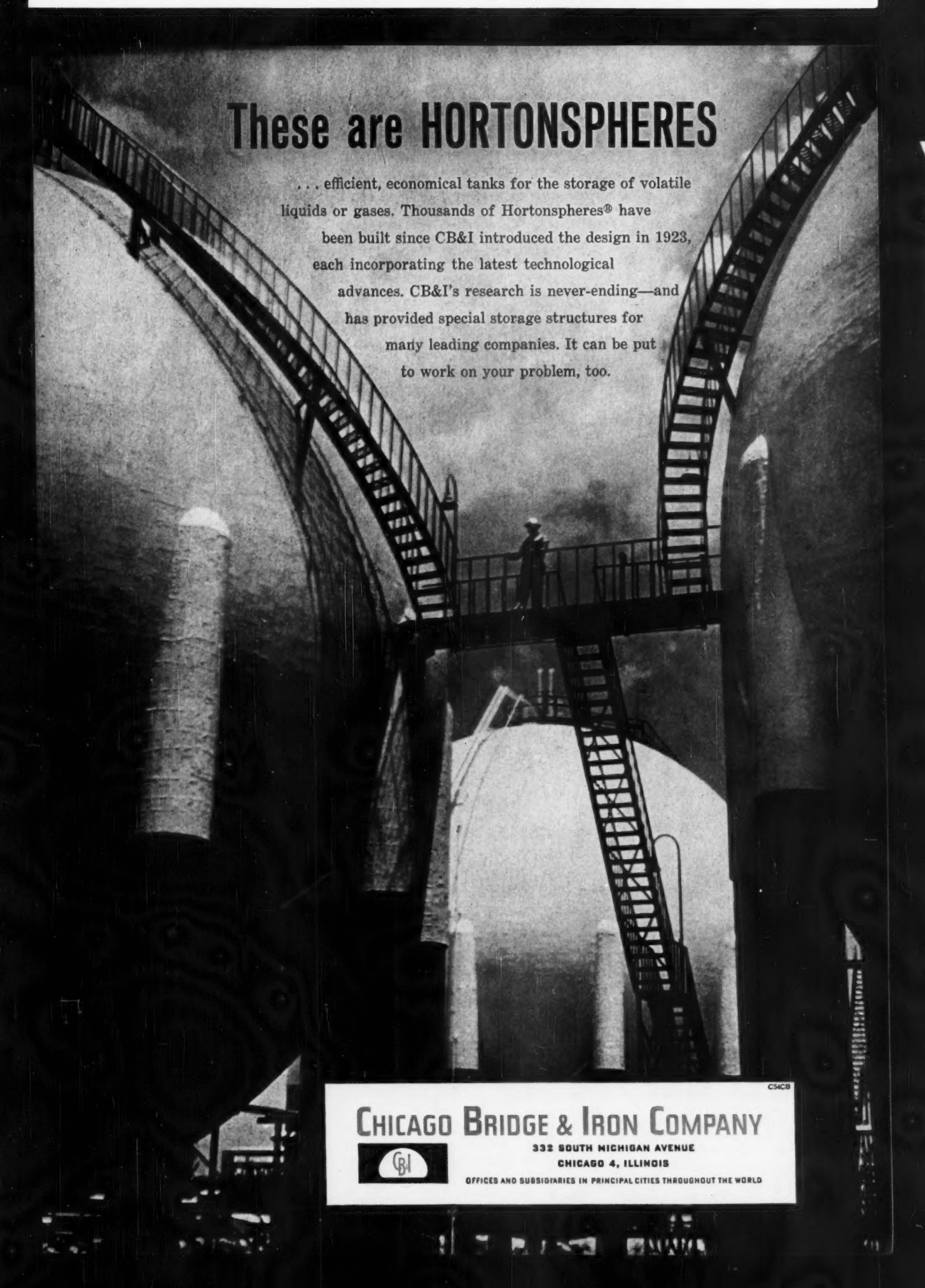
The conference replaces the annual symposium on antibiotics previously sponsored by MD Publications (by FDA until '57) and of which Henry Welch, antibiotics chief of FDA, was solely in charge. The symposium was abandoned after Welch was shown to have substantial financial interests in MD Publications. Now the society's conference is being promoted as being "under new management."

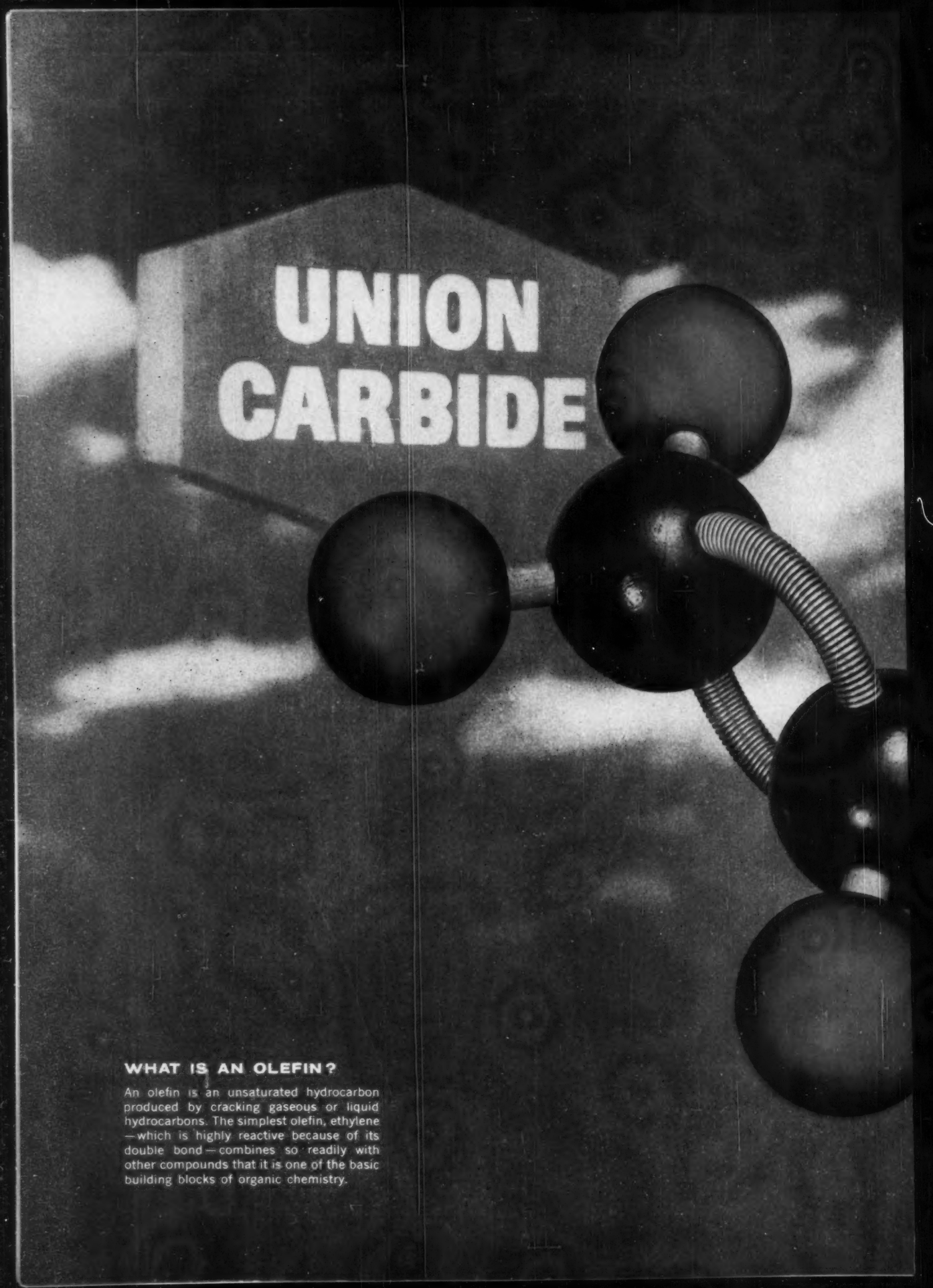
The society has appointed a committee headed by Lloyd Herman of the National Institutes of Health and eight other members (none from FDA) to carry on the annual event.

No 'Commercials': This year it is staged in a way that will keep it free of any financial "taint" from private organizations or companies. The old conferences were free, underwritten by the sponsors, with hospitality furnished by the drug companies. This year there is a $10 registration fee covering all expenses, and cocktail parties are strictly "Dutch treat." The turnout of 500 scientists is several hundred less than in previous years, undoubtedly because the society did not begin promoting the meeting until July 25.

For the same reason, the number of papers submitted dropped from 260 to 101, but Herman asserts there is no diminution in quality. Of the 101, a total of 83 were screened for presentation by the committee. In previous years, Welch and his handpicked committee did the screening.

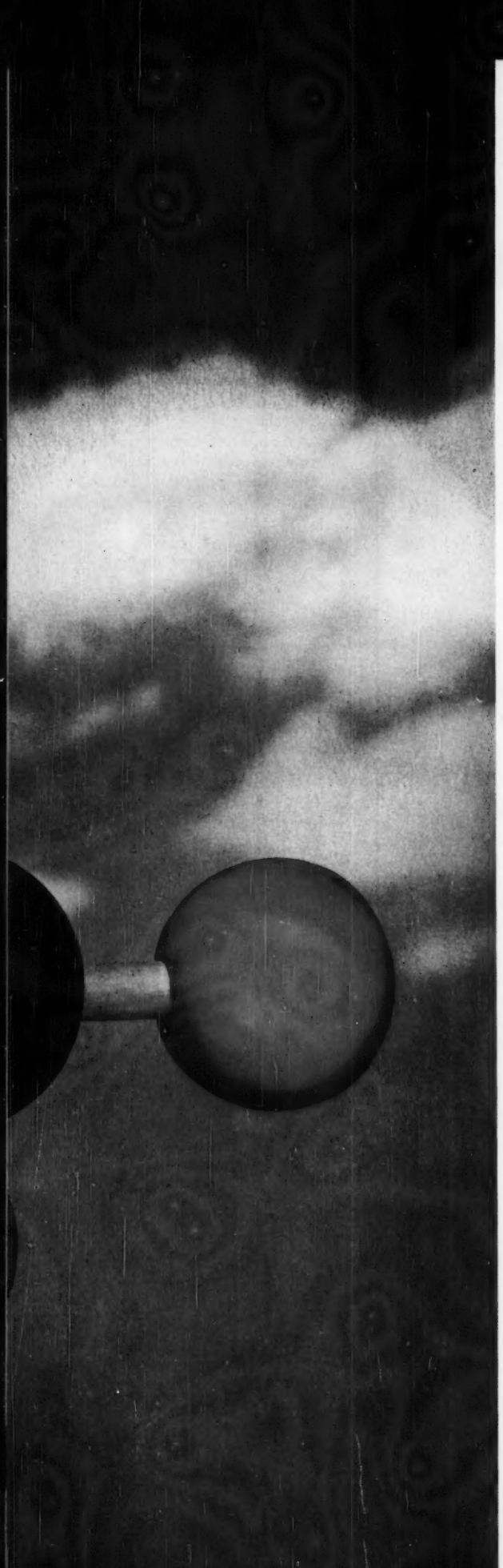
Complaints about previous confer-


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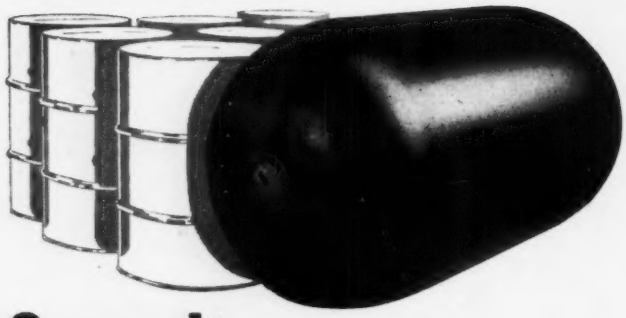
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ences included private sponsorship, which encouraged participating companies to use the forum as a means of plugging new products. Last year one company, for instance, brought in scientists from Germany and South America to present favorable papers.

This year a circular promoting the conference noted that the budget is limited and that there would be "no flooding of the press room with releases in support of new products." Instead, the press room was managed by the American Institute of Biological Sciences, of which the society is a member, with press conferences arranged each day on important subjects.

The three-day meeting covered clinical studies, new products, laboratory studies, and the like—and two new antitumor agents produced by streptomyces strains. A method of reducing bacterial metabolism of sugar during the refining process, saving as much as 6 tons/day, was described. Conference proceedings will be edited by Peter Gray of the University of Pittsburgh and will be published in about six months.

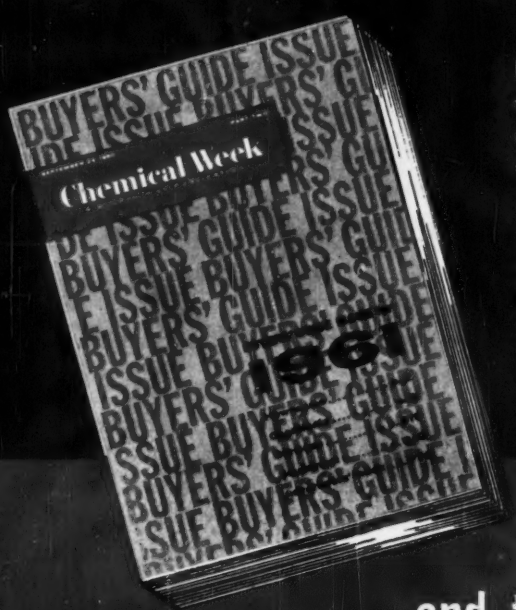
Emulsion Paint Gain

Water emulsions of linseed oil-base paints are moving closer to commercialization this week. The U.S. Dept. of Agriculture's Northern Utilization Research Laboratory (Peoria, Ill.) reports that it has made successful test paints of this type.

They are said to have advantages of both conventional oil-base paints and the newer synthetic emulsion types. The linseed-oil-in-water emulsions give test paints that resist running water within 15 minutes after application, are ready for a second coat within one-half hour. They are also reported to adhere well to chalking surfaces, to flow easily and to have good covering properties. Like the synthetic water emulsions, they can be washed from brushes and rollers with water.

Key developments that paved the way for the successful test paints were modified emulsifiers made from linseed oil fatty acids. Prior to development of these new emulsifiers, zinc oxide used in exterior paints would cause the emulsion to invert to a water-in-oil emulsion. The new formulations have proved to be stable for about a year; goal is four years.

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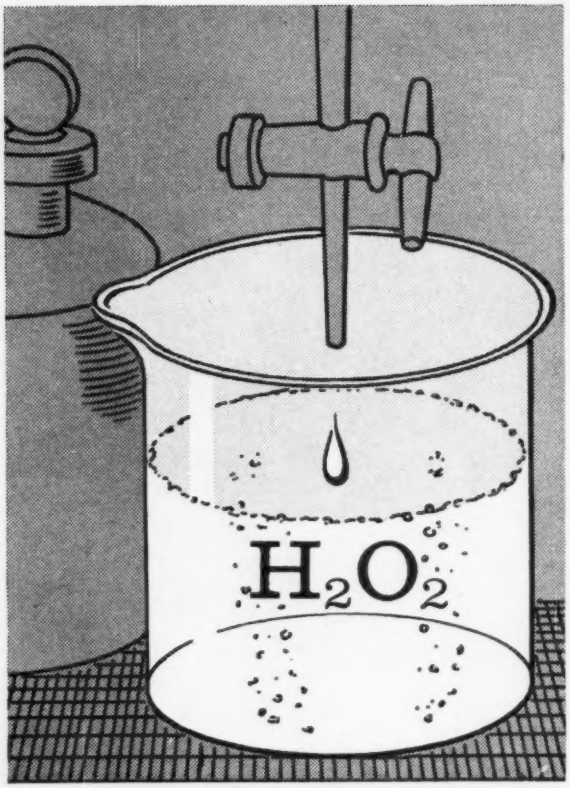


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How 3 industries are profiting with Du Pont Peroxides

Is there an idea here for you?



ORGANIC CHEMISTRY

Du Pont "Albone" hydrogen peroxide is being used profitably by the chemical industry for:

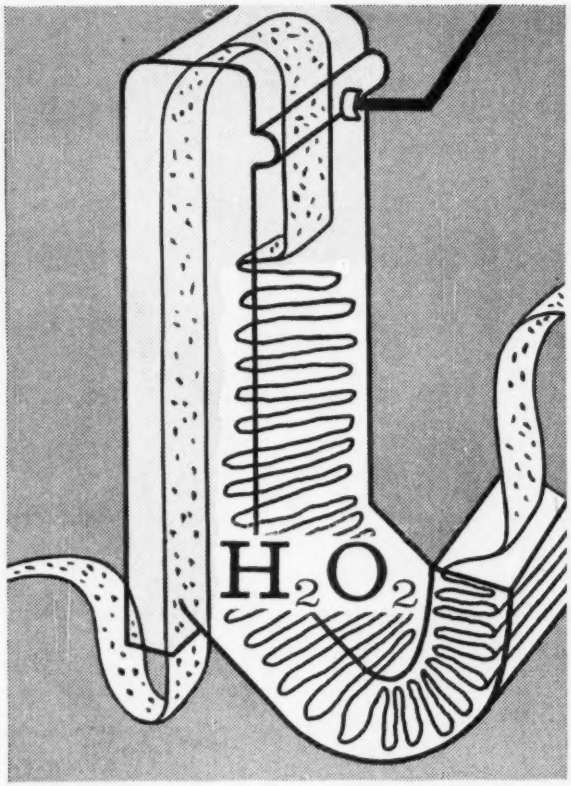
- **Manufacture of epoxidized oils and fatty acid esters for use as stabilizers and plasticizers for polyvinyl chloride resins.**
- **Manufacture of organic peroxides.**
- **Polymerization of unsaturated monomers.**

One major advantage of using "Albone" in organic reactions is that water, a product of the oxidation, is easily removed. This permits the manufacture of products with a high degree of purity . . . less contamination by objectionable by-products.

The oxidizing action of hydrogen peroxide is due principally to the activated state of oxygen in the peroxide molecule. Some organic oxidations require the use of a peracid which is easily prepared from an organic acid and hydrogen peroxide.

Du Pont's new 142-page book, "Hydrogen Peroxide in Organic Chemistry", provides new ideas and describes Du Pont innovations to help research chemists develop new organic chemicals with hydrogen peroxide. For your copy write address at right.

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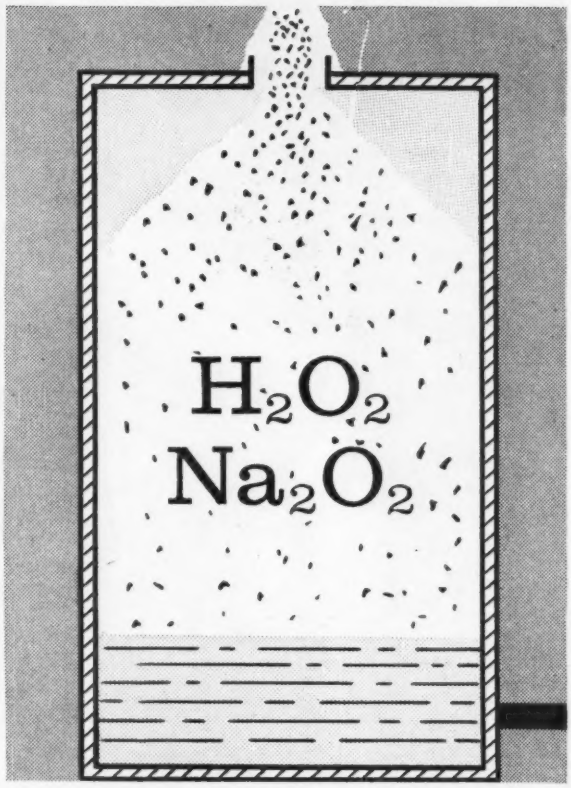
Hydrogen peroxide is used to bleach nearly 90% of all cotton goods because it gives permanent whiteness and color stability with maximum retention of fiber strength.

The textile industry has benefited not only from these advantages of "Albone" but also from its use of these three cost-cutting processes developed by Du Pont:

New Rapid Bleach for medium- to heavy-weight fabrics is adapted to any continuous or semi-continuous open-width system. Advantages: Cuts storage to as low as 8 minutes in each J-box; cuts J-box cost; eliminates rubmarks, bruises and creases; improves dyeing quality of fabrics.

Du Pont Solo-Matic for light- to medium-weight fabrics runs at high speed in rope or open width forms. Advantages: Doubles your production in existing space, or maintains the same production in half the space.

New Pressure Bleach for all types of cotton bleached in kiers or package systems. Advantages: Reduces process time up to 50%; doubles production in existing equipment.



PULP AND PAPER

Du Pont peroxides are being used profitably to bleach groundwoods, sulfite and kraft pulps and new cold soda pulps because they produce high brightness pulp with excellent brightness stability.

Over 95% of all groundwood bleacheries using peroxide have found that the use of hydrogen peroxide and sodium peroxide in combination cuts costs up to $1.25 per ton by eliminating the use of caustic soda. Du Pont manufactures both hydrogen peroxide and sodium peroxide and is experienced in helping mills install effective combination formulas.

Mills bleaching sulfite and kraft pulps are obtaining brightness values up to 90. These peroxide-bleached pulps are premium pulps because they maintain high brightness values during periods of normal shipping and storage.

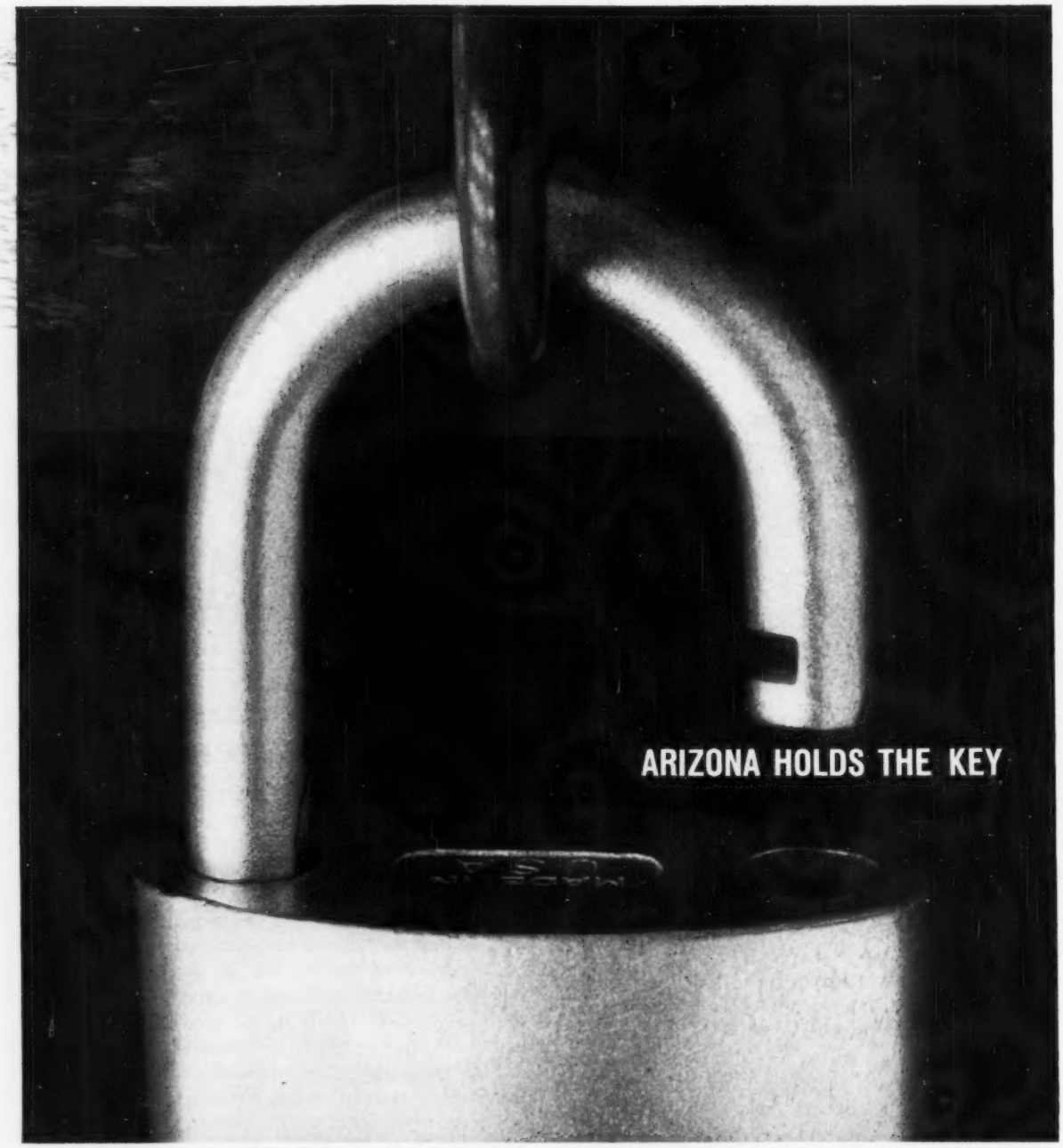
Many mills, with the help of Du Pont peroxides, are effectively and economically bleaching the new cold soda pulps made from hardwoods. Du Pont's experience can help mills save thousands of dollars by making the right choice between tower and refiner bleaching.

MORE INFORMATION AND TECHNICAL HELP. Perhaps these uses suggest a way in which *you* can profitably use Du Pont peroxides. Call your Du Pont representative . . . he'll be glad to work with you to help develop your ideas into actual uses. Or write for informative literature on Du Pont peroxides: Du Pont, Electrochemicals Department, Wilmington 98, Delaware.

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Shell patent tells how direct dehydrogenation works



Parallel Purification Ups Isoprene Profits

A significant new patent (above) has just become available in Australia. It describes a process, assigned to Shell International Research Maatschappij, N.V., for the production of isoprene by direct dehydrogenation —Shell says it's "the best method of performing it known to us." Shell is currently starting up or constructing three isoprene plants based on a new process.

Although the company has refused to link the new patent with these plants, there's good reason to believe there is a close tie-in.

There is also good reason why Shell doesn't want to talk about the process. Isoprene is the basic monomer of natural rubber and, though the chemical industry has been trying to produce it commercially for years, only one other process has shown any sign of success so far. It is a fairly old one—a two-step route involving the reaction of isobutylene with formaldehyde, followed by subsequent dehydration. It was used by the Germans during World War II, is now under development in France.

This process was described by M. Hellin, H. Guerpillon and F. Coussement, of the *Institute Francais du Petrol*, at the World Petroleum Congress (New York) in June '59. They pinpointed the roadblock that has stymied the more attractive direct-dehydrogenation processes: product separation. Direct dehydrogenation to isoprene resembles the well-known route to butadiene—dehydrogenation over catalyst of a mono-olefin (isoamylene or butylene) to a diolefin (isoprene or butadiene). It is the expected route, except that the impurities produced during dehydrogenation reaction have been, so far, too hard to separate.

Vaulting the Roadblock: But isoprene rubbers now seem about to crowd natural rubber out of much of its current market (*CW, Oct. 22, p. 81*). And reports that Shell's new plants are using butylene and isoamylene feedstocks show clearly that it has bypassed the product purification roadblock.

According to the patent, the new process involves four stages:

(1) Catalytically dehydrogenating a mixture of olefins, butylene and amylene, producing the diolefins, butadiene and isoprene, along with some light gases and a small amount of heavier polymeric material.

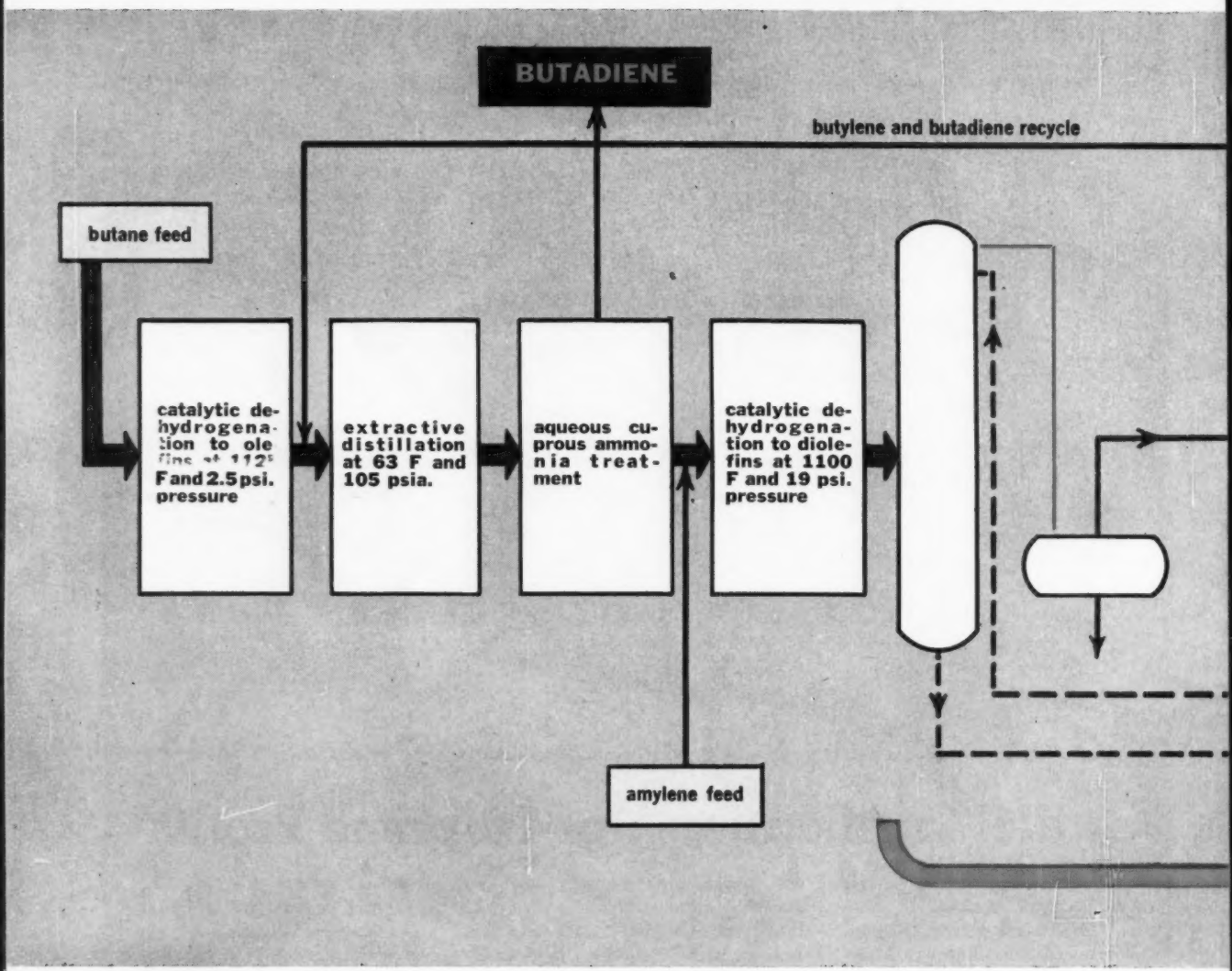
(2) Passing this product mixture through distillation steps that separate the light gases and polymeric materials from a heart-cut of butadiene and isoprene.

(3) Distilling this heart-cut to separate the butadiene from the isoprene.

(4) Separately purifying the butadiene and isoprene by further distillation.

Mixing for Money: These steps

How Shell has solved the purification problem of



seem conventional. In fact they are. Separately, they have all been used for the commercial production of butadiene. And all are known to apply to isoprene. Yet, step two—the purification of isoprene from the dehydrogenation by-products—has been too expensive for commerical operation when isoprene is handled alone. Consequently, Shell is apparently processing isoprene together with butadiene.

In the words of Shell scientists: "Independent operations preclude the advantage of reduced capital outlay normally possible in the purchase of larger equipment. There are also frequently somewhat reduced labor and utility expenses in the daily operation of a large single unit, rather than two smaller units of an equal or joint capacity." And: "The common dehydrogenation of the butadiene and isoprene precursos . . . results in a better yield of both isoprene and butadiene."

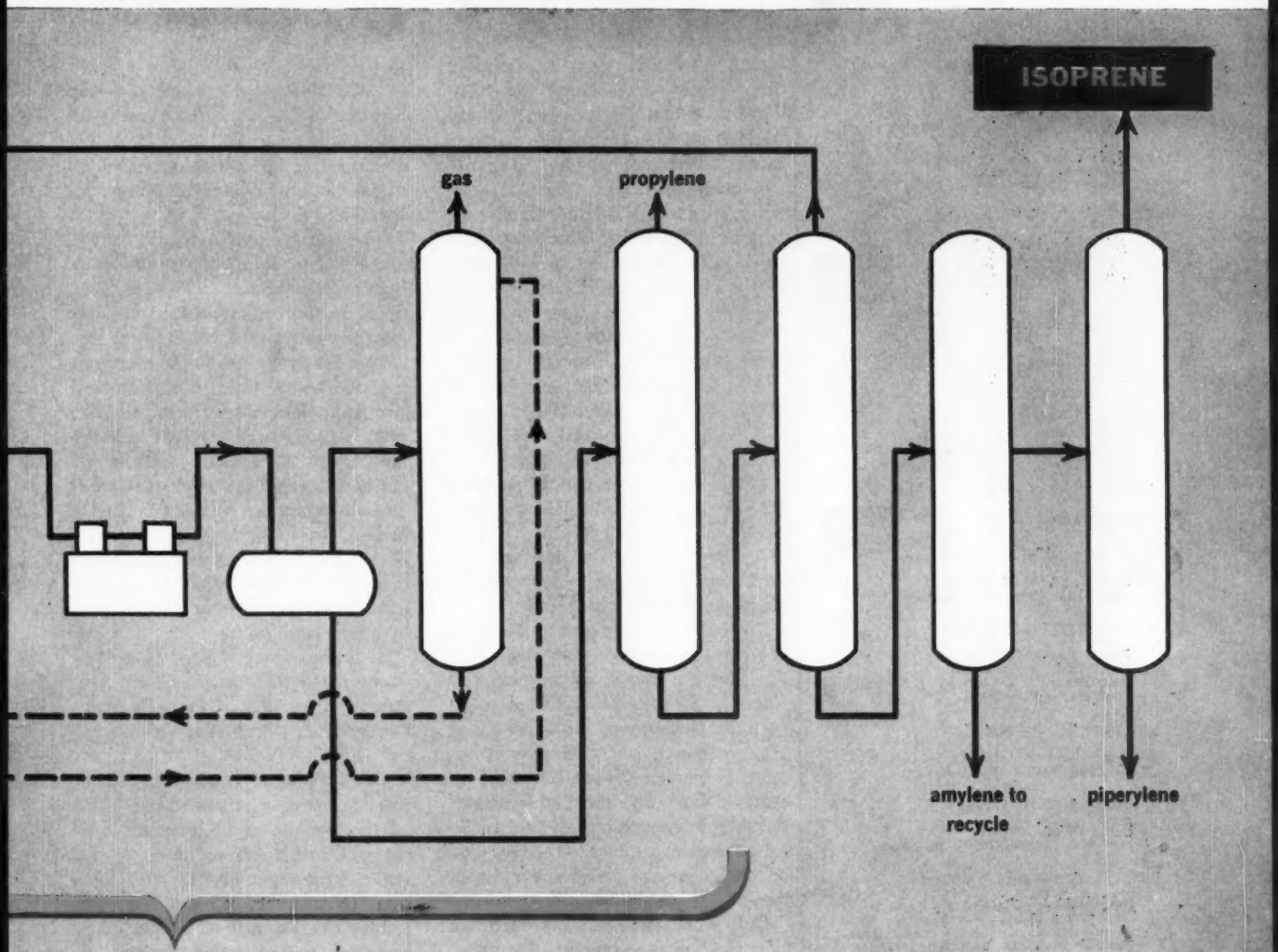
Here's how Shell has arranged to run the two processes together:

Like the process in use in Shell's Torrance, Calif., plant (*CW, Feb. 20, p. 71; Feb. 13, p. 85*), the process in the patent uses the olefin isoamylene as its isoprene precursor, and the paraffin butane as its butylene precursor. The butane is converted into butylene before the two raw materials are mixed. This is done by passing butane over a catalyst of active alumina impregnated with chromium oxide. Two reactors are employed alternately, 7-15 minutes onstream.

The butylene is then purified from unreacted butanes by two-stage extractive distillation with aqueous acetonitrile. Following this, it is separated from any butadiene by a liquid-liquid extraction with aqueous cuprous ammonia acetate. The butadiene goes off as product, and the butylene moves forward to be mixed with the amylene feed.

Double Dehydrogenation: This combined stream of butylene and amylene is the basic feed from which

direct dehydrogenation for butadiene and isoprene



KEY: Parallel purification of butadiene and isoprene

butadiene and isoprene are produced. It is vaporized, then fed to the catalytic dehydrogenation unit, a bank of reactors operating in parallel, each containing a fixed bed of iron oxide catalyst promoted with chromium oxide and potassium carbonate. The reactor inlet pressure is about 10 psi. gauge; outlet pressure is 4 psig.; and the temperature is about 1100 F. Conversion of butylenes into butadiene is about 25%; conversion of amylene into isoprene is about 35.5%.

Parallel Purification: The gases leave the dehydrogenation reactors (at about 460 F) containing light gases and polymeric materials as well as unreacted butylene and isoamylene and the butadiene-isoprene products. They are fed directly into a "stripper-scrubber," where a downflowing stream of recycled oil cools them and absorbs the polymeric materials. The stripper-scrubber is operated at essentially atmospheric pressure and temperatures of 220 F (top) and 360 F (bottom).

Leaving the top of the stripper-scrubber, the gases pass through (1) a cooler, which condenses water vapors, (2) a separator, which allows the condensed water to be drawn off, (3) a compressor, which compresses them to 105 psig., and (4) an ammonia chiller, which condenses all but the light gases. They then go to a second separator, where they are separated from the now-liquid mixture of products and unreacted feed.

From the separator, the light gases pass to an absorber, where entrained product materials are taken out. The liquid, meantime, is pumped through heat exchangers to a "depropanizer" distillation tower. In the depropanizer, carbon dioxide and propane are separated from a mixture of butylene, butadiene, isoamylene and isoprene; this mixture leaves as bottom product.

Butadiene and Isoprene: This is the last step in the parallel purification stage, for the bottoms from the depropanizer flow directly to a "fractionator," which separates the butylene-

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butadiene mixture (top product) from the isoamylene-isoprene mixture (bottoms). The butylene-butadiene mixture is recycled back to the liquid-liquid extraction step in the feed preparation stage, where the butadiene is separated out as product and the butylene sent forward again to catalytic dehydrogenation.

Isoprene Key: Meanwhile, the isoamylene-isoprene mixture from the bottom of the fractionator passes first to an extractive distillation with aqueous acetonitrile (which removes isoamylene for recycle), then to a distillation column, where piperylene is separated from the isoprene product.

This is the process described in Shell's Australian patent (No. 57725/-60). It may be identified with Shell's plants on three crucial points:

(1) Both the plants and the patented process simultaneously produce butadiene and isoprene.

(2) Both use butane and amylene as feedstocks, therefore both use the direct dehydrogenation route.

(3) Both suggest economical production of isoprene—the plants because Shell is busy building them, the patent in the statements quoted.

Actual investment costs have not been prepared, since this would require a complete process design of an example unit, and then an estimate. But there is enough information in the patent for experienced engineers to do such a process design and estimate take-off.

Only when Shell publicly opens its two U.S. plants—one at Torrance, the other at Marietta, O.—can precise evaluations of its new process be made. Meanwhile, the new patent gives clear new insight into Shell's research and process engineering.

PROCESSES

Metal Cladding Process: Protective coatings may be sprayed on valves, fittings and nozzles by a new process developed at Rocketdyne's Solid Propulsion Operations (McGregor, Tex.). Key: a "spray machine" that converts powdered metals into a "plasma" at temperatures of about 25,000 F. The machine is operated by hand (like operating an oversize welding torch) to apply the metals directly onto the parts to be coated. When applied, the metal plasma condenses, firmly bonded to the base metal. Various powdered metals may be used. Mild steel rocket nozzles have been given coatings that withstood exhaust blasts at over 5500 F.

•

Coke Process: Here are the just-revealed details on a new process for coke production (*CW, Oct. 15, p. 72*) developed by Salem-Brosium Inc. (Carnegie, Pa.) and Whitney & Kammerer Inc. (New York):

The process uses a rotary furnace about 70 ft. in diameter and 5 ft. high with a bed of coal 4 to 8 in. thick. In the continuous process—the first in coke manufacturing—the bed rotates slowly—a revolution every one to three hours. Coal is fed into one side and coke emerges from the other side, having passed through temperatures up to 2400 F. By-products will not be recovered, although they could be. Advantages over the competitive beehive and by-product processes include: lower investment; close control of product size and quality; and profitable operation without income from by-products.

A semicommercial pilot plant—capacity of 15-16 tons/day of coke—is slated to start production in mid-December at Dorchester, Va.

•

Latex Foam: A chemical technique for converting synthetic rubber latex into a complete replacement for natural rubber in foam products was revealed by Naugatuck Chemical Division (Naugatuck, Conn.) of U.S. Rubber Co. The new technique, called chemical agglomeration, raises the particle size of the polymerized butadiene-styrene emulsion—synthetic latex—to a point where it can be used in foam production. Key to this process is the use of a special-molecular-weight polyvinyl methyl ether. This permits evaporation to increase the rubber solids content in the latex from 40% to 70%, while still keeping a free-flowing latex stream. A system was devised to use the methyl ether during the evaporation process, so that agglomeration occurs at the same time that excess water is removed from the latex, cutting cycle time and investment.

The process is said to benefit foam producers in that the synthetic product is about 5-10% cheaper than the natural latex and conversion into foam is 80% with synthetic vs. only about 60% with natural latex.



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GULF

Washington
Newsletter

CHEMICAL WEEK
October 29, 1960

No solid economic upturn is in sight before mid-'61, but when it comes, it will be solid. This is the estimate Washington is getting from top economists in chemicals, steel, autos, rubber and other basic industries.

Latest economic data is discouraging. The third-quarter decline in the gross national product is the first real dip, excluding the steel strike, since the third quarter of '57. Fourth quarter business is expected to turn up a bit, due largely to the fall increase in auto production. Housing activity in September fell off 17% from August, dashing hopes of a strong economic push there. Chemicals, petroleum and rubber were down slightly in the third quarter (seasonally adjusted); primary metals continued their '60 sharp decline. It all adds up to a GNP for '60 of about $505 billion, compared with the $515 billion predicted at the beginning of the year. But it is still well above the '59 figure of $482 billion.

Industry economists look for a modest decline in the first half of '61, followed by a brisk recovery. They look for the '61 GNP to end up at about $512 billion, based on a fourth-quarter performance rate of about $525 billion, a real boom level.

•

The poor showing gives Kennedy a strong talking point. It gives him a chance to hit the domestic issues, where he feels he is strongest. Nixon will counterattack by raising fears of inflation under a "loose money" Kennedy administration, a possible run on U. S. gold reserves. Farm income in the third quarter is up slightly, giving Nixon a boost in the Midwest. But the wage-salary pinch hits hardest in Pennsylvania, Ohio, Michigan, the states with the big electoral-vote prizes.

•

Justice Dept. broadens its probe of identical bidding on rock salt as part of its increased antitrust activity against price fixing. Bids to some 360 cities are being sifted by investigators for signs of identical bidding. Suspicious ones will be passed along to a federal grand jury sitting in Springfield, Ill., which is looking into complaints that rock salt bids are fixed.

Government trustbusters are encouraged by their victory in a case against 10 asphalt makers charged with conspiring to fix prices in New England. Allied Chemical and Koppers are among those involved.

Originally Allied and Koppers refused to sign the government's consent decree, as did the eight other defendants, and pushed the case to trial. But after hearing only two government witnesses against Allied, Boston federal judge Charles E.Wyzanski, Jr., suspended trial, suggested that enough evidence had already been submitted. Allied consented and Koppers admitted Sherman Act violations in court. Judge Wyzanski's judgment bars all 10 from entering illegal price-fixing agreements and requires that for the next five years they submit affidavits with government bids, swearing bids were arrived at independently.

Washington Newsletter

(Continued)

Fifty-two cities, including Boston, have filed treble damage suits to collect for excessive prices paid for asphalt under the alleged illegal agreements. These will be heard later. Also pending are similar price-fixing suits involving sales of road tar and bituminous concrete.

•

The cost of hauling chemical products by rail has jumped 1.7% as a result of a rate hike on virtually all commodities approved by the Interstate Commerce Commission.

The basic increase amount to ½¢ a hundredweight where the existing rate is 65¢ or less per 100 lbs., and 1¢ where the rate exceeds 65¢. Sulfur, fertilizer and coke producers strongly protested the increases, but to no avail.

•

Detailed design of "super-size" solid-propellant rocket boosters will be studied by Grand Central Rocket Co., Thiokol, and Aerojet-General under 6-month contracts from NASA. Grand Central is to work on a first stage for vehicles in the 1-million-lbs. class, Thiokol for vehicles in the 7-million-lbs. class, and Aerojet-General for both classes.

The giant solid-fueled rockets are aimed to produce thrusts ranging from 2 million to 15 million lbs. This means they would be some 10 times as powerful as the Atlas- and Titan-type engines now used for space flight and several times as powerful as the Saturn and F-1 liquid-propellant superboosters now under development.

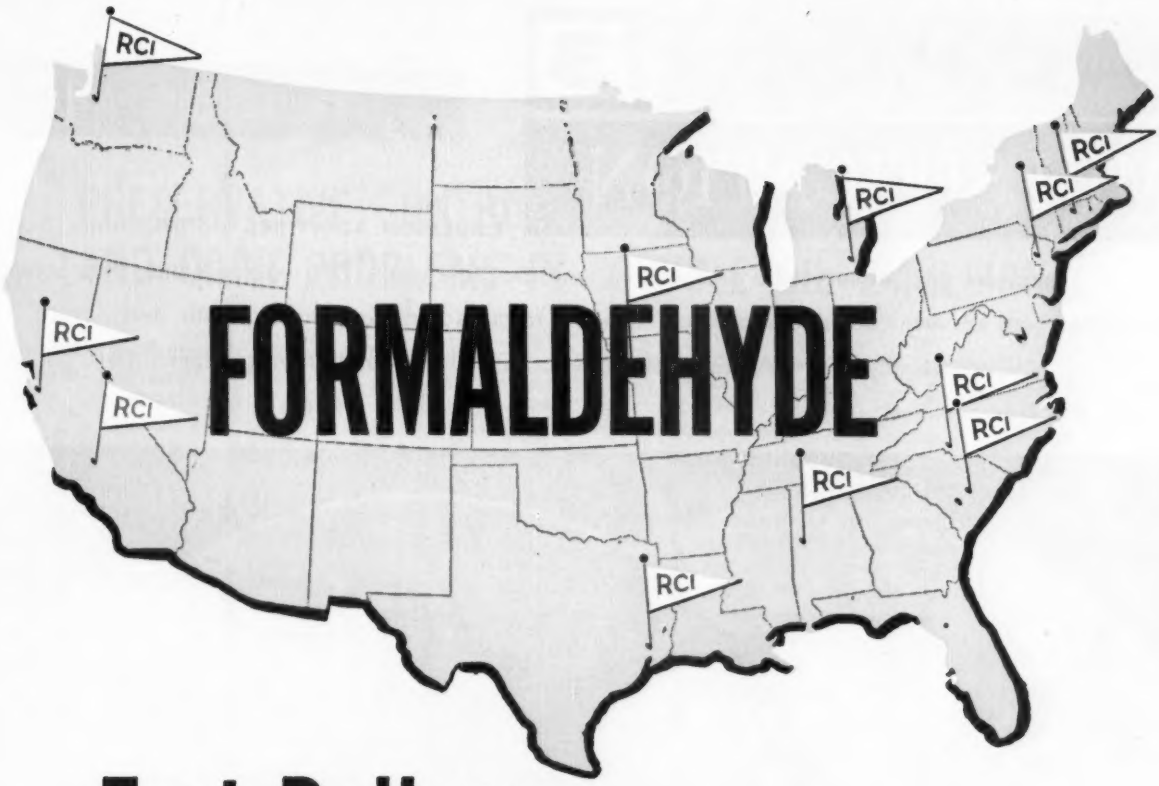
The three new study projects will be based on solid propellants already available—the composite and double-base composite types used in such rockets as Thiokol's Minuteman first stage and Aerojet-General's Polaris and Scout first stages.

NASA officials feel the giant solid-fueled rockets may have "dramatic advantages" over the liquid types in terms of cost, performance and logistics. If the contractors can prove the feasibility and economic advantages of the super-size solid types, NASA may decide to order fabrication of the engines, pitting them in development competition against the liquid-fueled superboosters.

•

New look at automation problems by officials of industry, government and labor is contained in a 604-page compilation by the Joint Economic Committee of Congress. It updates the first important study in '56 with views from the same individuals.

From the chemical industry, Dow's director of nuclear and basic research, John J. Grebe, reports that a constantly growing percentage of money spent on new chemical companies goes for advanced instrumentation. A moderate-size manufacturing plant will use 5-20% of its cost for instrumentation. The chemical industry is more dependent on automatic control than is any other large industry, Grebe reports.



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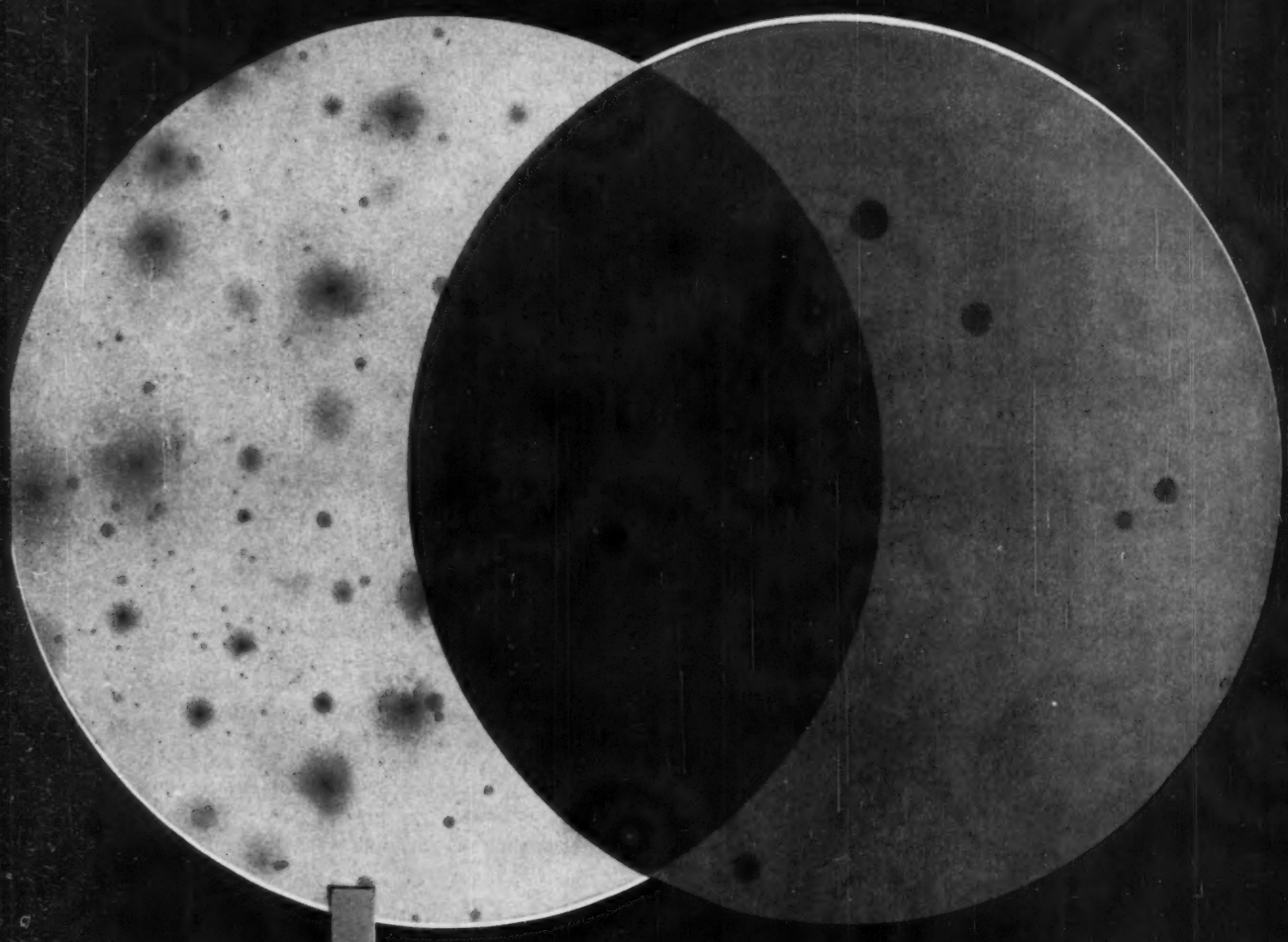
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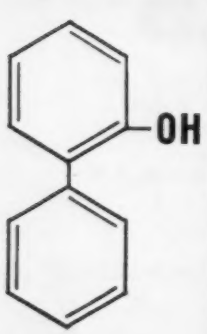
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Dow **C.P.I.** *file* **3**

EMULSIFICATION

EMULSION ADDITIVES are frequently necessary to preserve the desired emulsion characteristics. The leading emulsion problems controlled with additives are decomposition resulting from bacterial or fungal growth, and instability or undesirable color effects due to trace metal ion contamination.





MOST EMULSIONS contain materials which support the growth of bacteria or fungi. These microorganisms subsist on the emulsion components and produce metabolic waste products, many of them acidic. These waste products react with the emulsion components and decompose important constituents such as emulsifiers, dispersants, coupling agents, soaps, etc., thereby reducing the stability of the emulsion. Since many emulsion formulations are slightly alkaline, the waste acids can also affect the pH which frequently is critical to the stability of the emulsion. Effective control of both bacteria and fungi in emulsions is given by the Dowicide® products, a group of phenolic compounds the simplest of which is o-phenylphenol, Dowicide 1. Broad-spectrum bactericides, the Dowicide products are available with either water or oil solubility.

BACTERICIDE

PRESERVATIVE CONTROLS EMULSION BREAKDOWN AND ODOR PROBLEMS IN SOLUBLE OIL EMULSIONS

Dowicide A (sodium o-phenylphenate) has a long history of success as a preservative in soluble oil emulsions. Effective control of odor-causing bacteria and stability protection make it a valuable additive for metalworking cutting oils where contamination, odor, and corrosion are particular problems.

The concentration of Dowicide A that is generally necessary to preserve the emulsion is between 0.10 and 0.15% based on the total weight of the emulsion (water and oil). A practical method of attaining this concentration is to add 1 pound of Dowicide A to 100 gallons of emulsion (0.12%). This concentration will normally prevent emulsion breakdown and odor formation over an extended period even when machines are not operating. Bacterial protection is needed throughout the system. Badly contaminated systems should be cleaned and disinfected before treatment with Dowicide is started.

Latex paints, cosmetics, adhesives, and many other emulsion systems subject to organism attack are protected by treatment with Dowicide products. Full information on specific applications are available from Dow.

ADVANTAGES OF ADDING DOWICIDE TO AN EMULSION

- **Emulsions protected from bacterial decomposition**
- **Bacterial population held to a minimum**
- **Useable life of emulsion is extended**
- **pH of emulsion is not reduced**
- **Obnoxious odors prevented**
- **Discoloration due to organisms prevented**
- **Slime and sludge formation reduced**
- **Reduced corrosion due to bacteria acid in metal contact operations**
- **Reduced dermatitis caused by bacteria**

CHELATING AGENT

INACTIVATION OF TRACE METAL IONS PROTECTS STABILITY OF OIL, WAX, AND LATEX EMULSIONS

Versene® chelating agents added to aqueous emulsions are effective in preventing emulsion breakdown, rancidity, discoloration and coagulation. The Ca and Mg hardness ions affect stability, and Cu, Ni, Mn and other metallic ions can catalyze oxidation, which may lead to rancidity, discoloration, and coagulation. The amount of Versene necessary to stabilize aqueous emulsions depends on the hardness of the water used. Usually the Versene is added in a concentration of 0.05-0.2% by weight. Versene should be added as a 5-10% aqueous solution in order to avoid too heavy local concentration and possible emulsion breaking. The pH of the solution of Versene should be adjusted to that of the emulsion prior to addition.

In latex stabilization, Versene will prevent decomposition, precipitation, sludge formation, and putrefaction. Trace metal ions are complexed and their destructive influences are eliminated.

STABILIZATION OF AQUEOUS RESIN EMULSIONS. Traces of metal-ion contamination in aqueous resin emulsions frequently cause premature settling and instability. Also, in many systems, particularly those based on phenolic resins, traces of iron impart high, undesirable color levels through the formation of iron-phenolate-type complexes. Controlling these metal ions with chelating agents results in emulsions with improved shelf life and greater stability. The use of 0.5-1.0% of Versenex® 80 is usually sufficient to control color. *See "The Dow Hour of Great Mysteries" on TV.*

The Dow Chemical Company, Midland, Michigan
Chemicals Merchandising Dept. 427AM10-29.

☐ For information on Dowicide products, ☐ "Keys to Chelation" Booklet

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DOW

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Midland, Michigan

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FROM TORRID TROPICS TO SUB ZERO STRATOSPHERE



Stearic Acid plays an important role in the lubrication of today's longer-range, higher-flying planes. It is regularly converted by grease manufacturers to lithium stearate, which is further combined to produce all-temperature-reliable lithium grease.



1 BATH IMPROVES SYNTHETIC FABRICS 2 WAYS

A single soaking now makes man-made-fiber fabrics both static-free and water repellent. New bath formulation, developed in Czechoslovakia, calls for combining either Stearic or Oleic Acid and chromic chloride. Reportedly, the Oleic Acid gives a softer effect on knit goods.

SMOOTHER LICKIN' BECAUSE OF OLEIC ACID



Oleic Acid, when converted to glycerol monooleate and similar derivatives, makes ice cream smoother in texture. And prevents peanut butter, another favorite food of children, from separating into liquid and solid phases.

Below are facts you should know about two Fatty Acids produced by A. Gross. Why not write for samples and additional information on the Fatty Acids we produce. Send for the latest edition of the brochure "Fatty Acids in Modern Industry." Address Dept. CW-4.

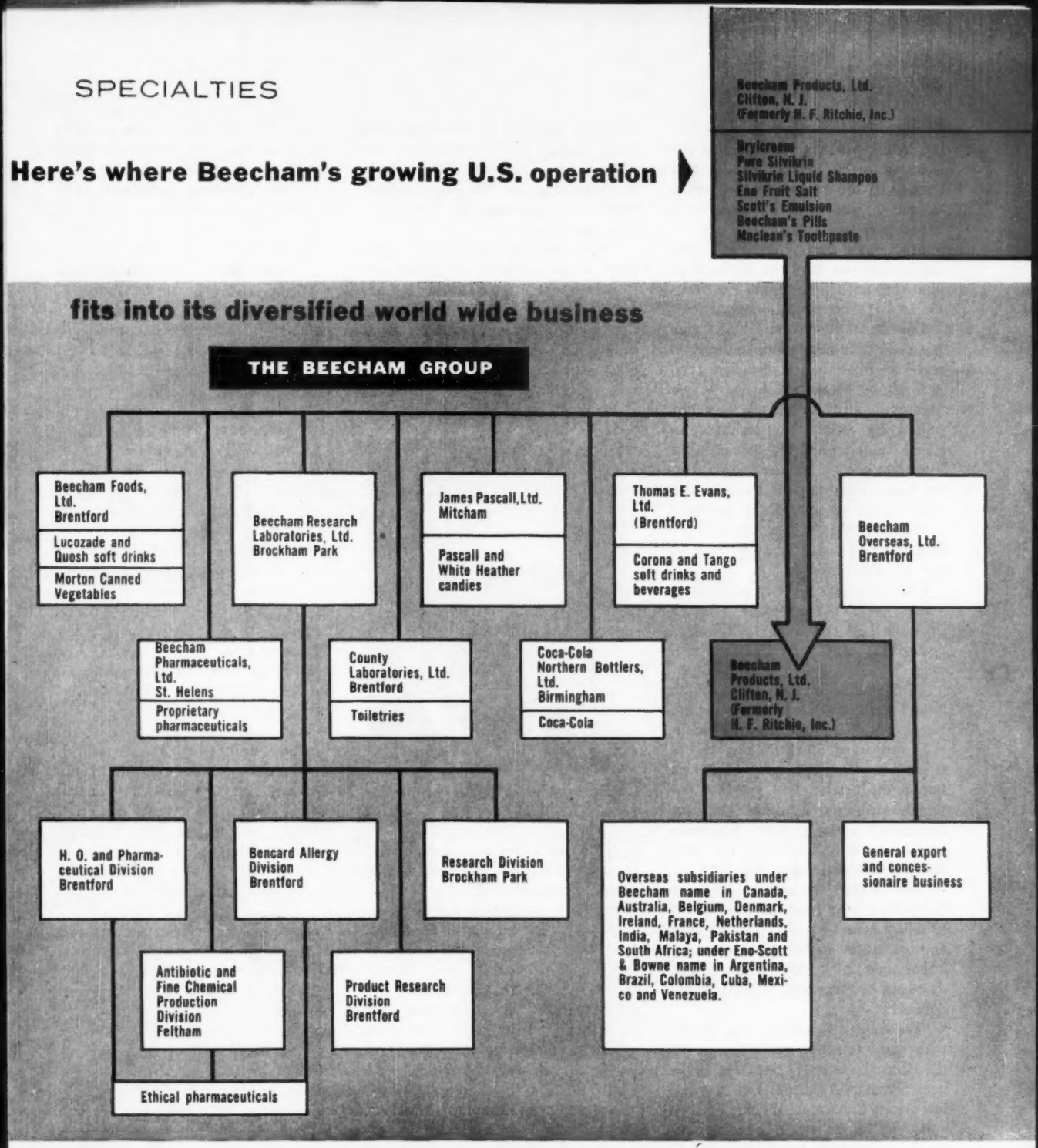
	HYDROGENATED TALLOW F.A. GROCO 58	WHITE OLEINE GROCO 5L LOW LINOLEIC
Titre	58° – 60°C.	2° – 5°C.
Titre	136.5° – 140.0°F.	36° – 41°F.
Color 5¼" Lovibond Red	1.0 max.	1 max.
Color 5¼" Lovibond Yellow	5 max.	8 max.
Color Gardner 1933		2 max.
Unsaponifiable	0.75% max.	1.0% max.
Saponification Value	204 – 207	201 – 206
Acid Value	203 – 206	200 – 205
% F.F.A. as Oleic Acid		99.5 min.
Iodine Value (WIJS)	2.0 max.	90 max.
Refractive Index 50°C. (Av.)		1.4490
Total Polyunsaturated F.A.		3.5% max.

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Here's where Beecham's growing U.S. operation fits into its diversified world wide business



Beecham Charts Growth in U.S.

A new product and a new company name will soon be competitive forces to reckon with in the U.S. specialties market. The product: Macleans Toothpaste. The company: Beecham Products, Inc. (Clifton, N.J.), a subsidiary of Britain's specialties giant, Beecham Group, Ltd. Both product and company reflect the British parent company's resolve to win a strong position in the U.S. marketing arena.

Macleans Toothpaste hit U.S. test markets a few weeks ago accompanied by vigorous local television advertising. Premium-priced Macleans, (2¾ oz., 63¢, compared with Colgate or Gleem at 3¼ oz., 53¢) presents some novelties for American consumers. It has no minty flavor (it's said to leave the mouth with a "tingling sensation"), and it's promoted for its cleansing qualities, not for its decay prevention ability, says

Beecham Products' director of marketing, William Ohme, who characterizes Macleans as a "dental dare." "You have to try the product for two weeks to get to like it. After that, we'd expect you to stick with us."

Macleans is one of England's leading toothpastes (Colgate ranks first) and the top-selling brand in Italy, Holland, Denmark and Ireland.

Imported Philosophy: Although Beecham Products (until recently it was called Harold F. Ritchie, Inc.) is a wholly owned subsidiary with a great amount of autonomy, its selling philosophy reflects the parent company's thinking and techniques: enter a market with a product as good as or better than any in the running, then match or exceed the competition's promotion budget. (Only Unilever spends more for advertising in the United Kingdom.)

One example of the technique's success here is the record of Brylcreem hair preparation, it is now a best-selling (100 million tubes/year) item in its field.

Beecham also markets Eno antacid, Scott's Emulsion, Scott's cod liver oil, Beecham's Pills, and Silvikrin shampoo and Pure Silvikrin hair conditioner in the U.S. The Silvikrin line is the newest, was put into national distribution in August. This line, incidentally, along with Macleans dentifrice, will likely get the next major promotion from Beecham.

New Name: The change of name from Ritchie to Beecham is intended to reflect actual ownership of the firm and to cash in on Beecham's growing importance in worldwide trade and its recent developments in the medical field.

"We wanted to acquaint the public with the fact that we are part of the Beecham Group," Beecham Products' Secretary-Treasurer Edwin Dinsmore told CHEMICAL WEEK.

But as far as origin is concerned the U.S. company was U.S.-founded. It is the outgrowth of a firm set up by two New York City druggists, Alfred Scott and Samuel Bowne. They began by selling a cod liver oil preparation called Scott's Emulsion. Then Harold F. Ritchie, a Canadian distributor of proprietary pharmaceuticals, acquired a controlling interest in Scott-Bowne, added a new product, Eno antacid, previously sold in Canada and Europe. In '38 the organization was acquired by Beecham, and it now makes the Beecham line in its 75,000-sq.ft., 250-employees plant. It is responsible for choosing raw-materials suppliers and for packaging and advertising.

The parent company's history goes back to 1842, when a 22-year-old farm boy, Thomas Beecham (grandfather of Royal Philharmonic conductor Sir Thomas Beecham), began selling his own formula for laxative pills. With that single product Beecham built a thriving business—the company did not add a second major line until '26 (Beecham Powders, a powdered aspirin product).



Chairman H. G. Iazell heads the $140-million/year Beecham complex.

In '28 family-owned Beecham became a public company, Beecham's Pills, Ltd. It acquired the equity of four other companies and thereby launched a program of expansion and diversification. Beecham now has more than 50 different advertised proprietary products, and sales in its last fiscal year (ended March 31) were $140 million.

Acquiring an Empire: Most of Beecham's growth has been by acquisition. The first four firms acquired in '28 gave it new medical proprietaries—and took it into toiletries with a shampoo. There were five more additions in '30, and further acquisitions came in '33, '35 and '36.

But these additions were small, compared with the acquisitions of '38—when the company added Macleans, Ltd. and Eno Proprietaries, Ltd., both relatively large factors in over-the-counter drugs.

In '39 Beecham made another major move in the toiletries field by purchasing County Perfumery Co. and its big-selling Brylcreem. The company branched out into soft drinks in '38 with acquisition of Lucozade.

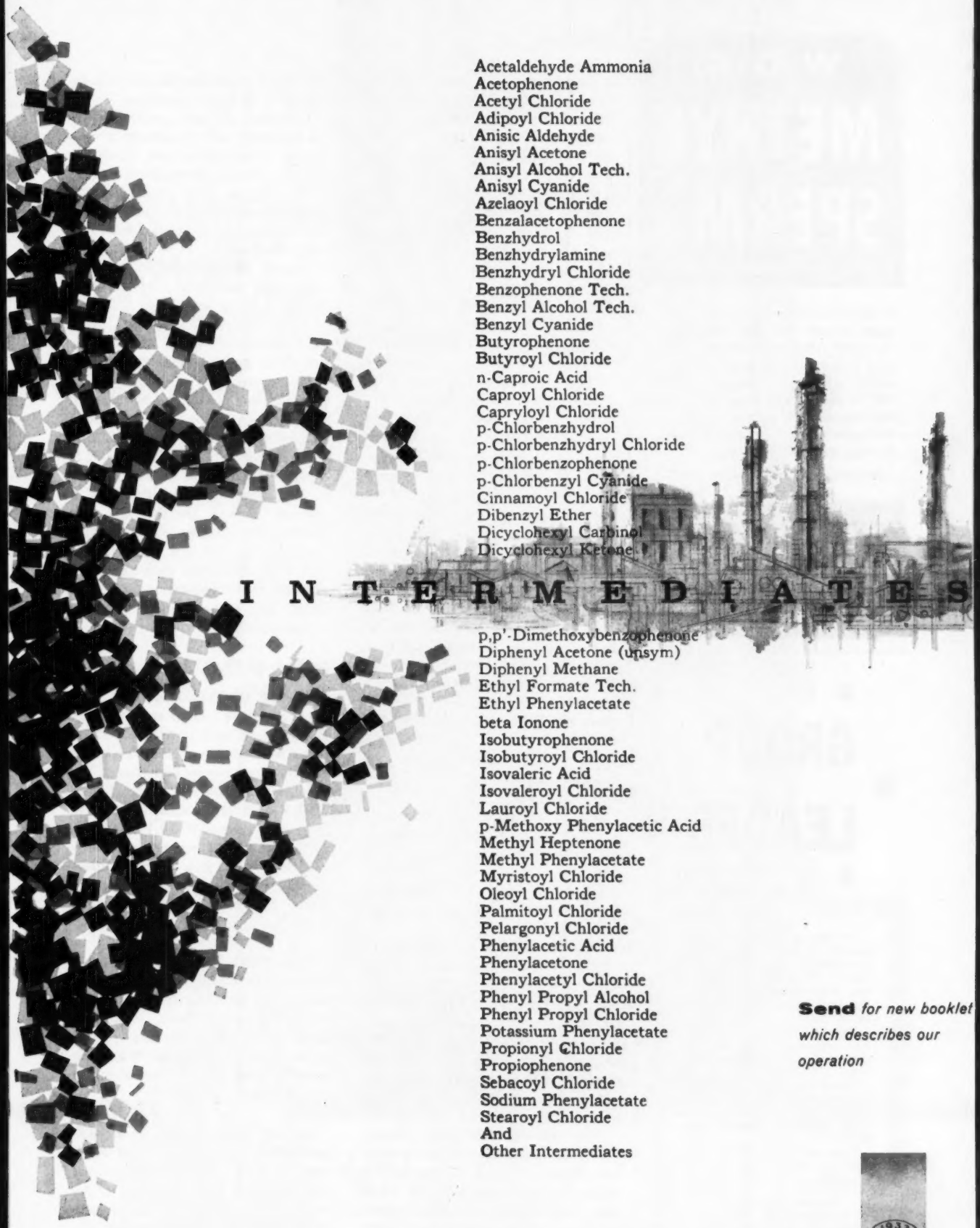
From this base Beecham began its big postwar growth (sales have tripled since '47). A subsequent series of purchases of food, beverage and confectionery companies have together made these fields the biggest portion of Beecham's business—$61.6 million out of last year's $140-million sales.

In the pharmaceuticals field only one proprietary company, Cephos, Ltd., has been acquired since '39. In '49 the company moved into ethicals by buying C. L. Bencard, Ltd., a company specializing in allergy preparations. The same year it also acquired Drugs, Ltd., which had the Silvikrin line of hair tonics, shampoos and creams. Last year the purchase of Du Lundi, Ltd., a South African company, brought Beecham into the deodorant field.

Overseas Arm: Meanwhile, Beecham was rapidly expanding its overseas business. A big help in this expansion was the '38 purchase of Ritchie's firm, which had a worldwide distribution system, plus manufacturing plants in the U.S., Canada, several South American countries, Australia and France. After the war, Beecham built up its foreign operations further. It now has manufacturing subsidiaries in 17 countries and markets in more than 100 others. Overseas sales last year came to $43 million—nearly one-third of total sales—compared with $11.2 million in '47. The Western Hemisphere gets top percentage of this: $21.5 million/year.

After Mass Markets: The company believes its future lies in developed economies that have mass markets—e.g., the U.S., Canada, Western Europe. As a result management is naturally concerned about the European economic split and has come out flatly for British membership in the Common Market. (Its Common Market sales are protected, however; Beecham has plants and manufacturing arrangements in most of the Common Market nations.)

In '51 Beecham Group, Ltd. (renamed in '45), found itself an unwieldy giant with more than 100 subsidiaries. The company decided to re-



INTERMEDIATES

Acetaldehyde Ammonia
Acetophenone
Acetyl Chloride
Adipoyl Chloride
Anisic Aldehyde
Anisyl Acetone
Anisyl Alcohol Tech.
Anisyl Cyanide
Azelaoyl Chloride
Benzalacetophenone
Benzhydrol
Benzhydrylamine
Benzhydryl Chloride
Benzophenone Tech.
Benzyl Alcohol Tech.
Benzyl Cyanide
Butyrophenone
Butyroyl Chloride
n-Caproic Acid
Caproyl Chloride
Capryloyl Chloride
p-Chlorbenzhydrol
p-Chlorbenzhydryl Chloride
p-Chlorbenzophenone
p-Chlorbenzyl Cyanide
Cinnamoyl Chloride
Dibenzyl Ether
Dicyclohexyl Carbinol
Dicyclohexyl Ketone
p,p'-Dimethoxybenzophenone
Diphenyl Acetone (unsym)
Diphenyl Methane
Ethyl Formate Tech.
Ethyl Phenylacetate
beta Ionone
Isobutyrophenone
Isobutyroyl Chloride
Isovaleric Acid
Isovaleroyl Chloride
Lauroyl Chloride
p-Methoxy Phenylacetic Acid
Methyl Heptenone
Methyl Phenylacetate
Myristoyl Chloride
Oleoyl Chloride
Palmitoyl Chloride
Pelargonyl Chloride
Phenylacetic Acid
Phenylacetone
Phenylacetyl Chloride
Phenyl Propyl Alcohol
Phenyl Propyl Chloride
Potassium Phenylacetate
Propionyl Chloride
Propiophenone
Sebacoyl Chloride
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Route 46, Clifton, New Jersey

organize (*see chart*), put all proprietary pharmaceuticals under Beecham Pharmaceuticals; ethicals under Beecham Research Laboratories; toiletries under County Laboratories; and food, beverages and confectionaries under three companies, plus a separate one for the Coca-Cola bottling franchise. Overseas companies —with the exception of the American firms—were made subsidiaries of Beecham Overseas, Ltd.

Today Beecham considers the keynotes of its philosophy are "specialization, concentration, and structural simplicity." These are favorite terms of Beecham Group Chairman H. G. Lazell, formerly with Macleans.

The company believes in applying these principles to all aspects of its business. When considering acquisitions, it looks for a small company with a successful product that has reached a point where it needs new capital and management. After an acquisition, Beecham pares down the product list to those it feels can be winners, drops the rest.

Research Fling: Another of Chairman Lazell's pet ideas is research. Before the war, Beecham did a respectable amount of product research but no basic research. Largely due to Lazell's initiative, a stepped-up program has since been launched. Now the company's total research effort is around $1.7 million/year and will soon be stepped up to a $2.5-million/year pace.

The most noteworthy research developments have been in pharmaceuticals, particularly the isolation, in '59, of the basic penicillin molecule, 6-amino-penicillanic acid. Its determination has opened up a new field of synthetic penicillins.

Deciding in '54 to concentrate most of its research effort on antibiotics, Beecham went to Nobel Prize winner Professor Ernest B. Chain, who suggested that the company attempt to modify the penicillin molecule. The risk of putting most of its research eggs in one basket—a highly competitive one in which Beecham was a late starter—paid off last year.

Two products utilizing the synthetic penicillin have been put on the market: Broxil, claimed to produce an antibiotic concentration in the blood after oral administration that is greater than that produced by any other known penicillin; and Celbinin, which overcomes staphylococci bacteria resistant to ordinary penicillin.

Overseas, the new penicillins will be supplied partly by Beecham Research Laboratories and partly by licensed foreign pharmaceutical companies. In the U.S., Bristol Laboratories (Syracuse) is the licensee and will market the antibiotic under the name Staphcillin.

What's Ahead: Like most British companies, Beecham is reluctant to speculate about its future. However, it seems likely that two main fields of concentration will be the synthetic penicillins and, overseas, toiletries.

The company is now studying its toiletries line to find gaps that can be profitably filled. It currently is developing a line of men's toiletries.

Since Beecham considers the U.S. a prime target for its goods and since it has shown spectacularly what it can do, chances are that any new toiletries it produces will be aimed specifically at the U.S. market. And U.S. companies other than toothpaste makers and hair-dressing producers would then get a taste of Beecham competitiveness.

PRODUCTS

Heating Oil Additives: Two additives, Paradyne HO-10 and Paradyne HO-20, have been developed by Enjay Chemical Co. (New York) as heating oil pour-point depressants. The products when used at concentrations of 0.01-0.1% (by weight) are said to lower pour points 10-70 F. Both additives are liquid at room temperature, are compatible with other additives commonly used in finished heating oils. Price: 75¢/lb. in commercial quantities.

•

Silver Polish: Union Carbide Corp.'s Silicones Division has developed a silicone finish for silver holloware. The tarnish-preventing finish, which is made at UC's Long Reach, W. Va., plant, will be supplied initially to silver manufacturers, later to consumers in aerosol form.

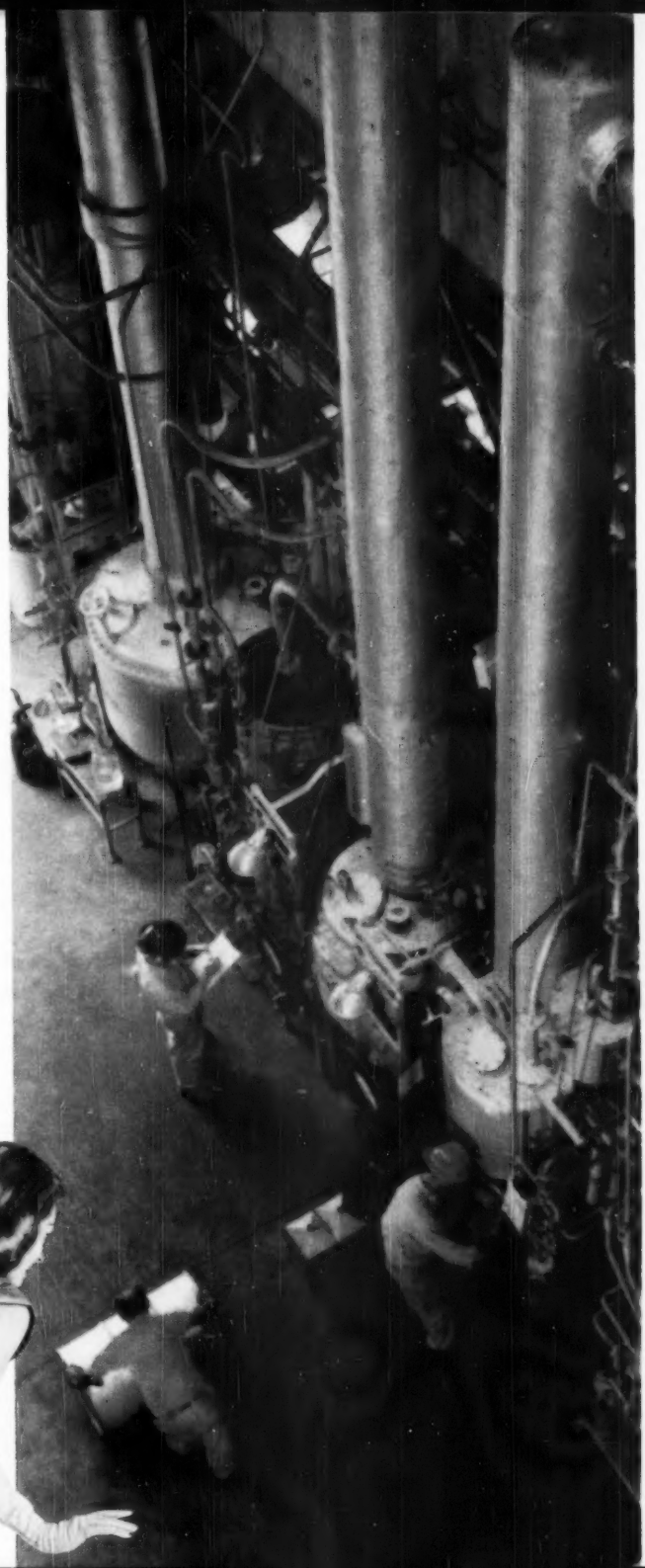
•

Aerosol Spray Starch: An aerosol-packaged spray starch has been developed by A. E. Staley Manufacturing Co. (Decatur, Ill.) under the tradename Sta-Flo. The 16-oz. can is now being test marketed in Springfield, Ill., and Kalamazoo, Mich.

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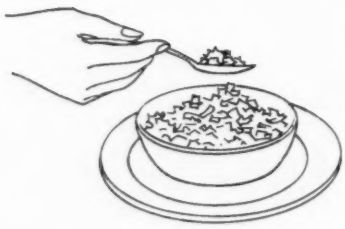
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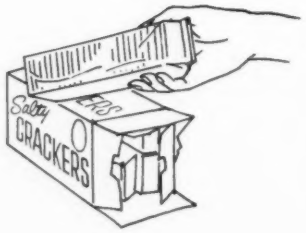
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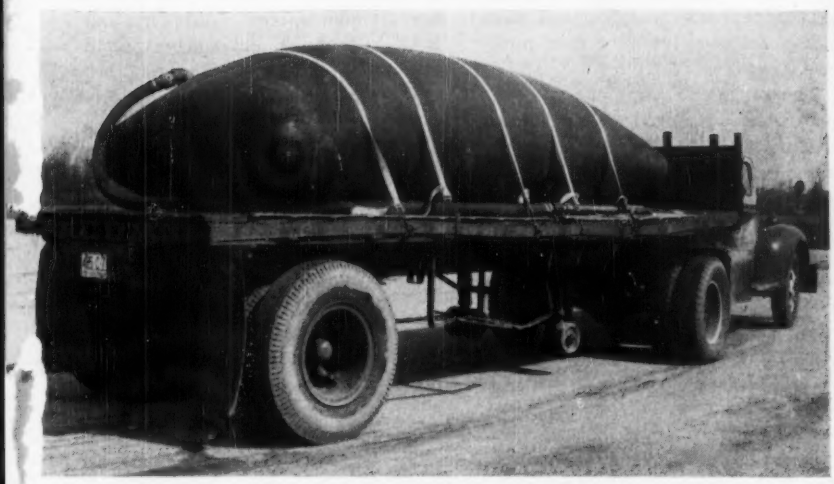
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Collapsible tanks: Do they make tank trucks out of flat beds?

Weighing Freight Bags' Fate

Last week a conclave* of truckers gave a lot of attention, both in meetings and out, to a topic that vitally affects chemical shippers: collapsible rubber "freight bags," and who's to own them, use them, haul them. Both the truckers and the chemical processors are awaiting an Interstate Commerce Commission decision that may resolve the questions of ownership and use—a ruling that will largely determine whether use of the bags will grow or shrink.

Also clearly concerned with the fate of the containers are the railroads, rail equipment makers and lessors, and tank truckers. All say they stand to lose by more widespread employment of the freight bags.

Although quite a few collapsible rubber tanks and bins have taken over jobs in chemical packaging recently—jobs that had been performed by steel drums and multiwall shipping sacks—chemical shipping men are convinced that the key to significant cost savings is the use of these containers by the nation's huge fleet of general commodity truckers. The truckers propose to use the bags for bulk shipment of solids and liquids at lower-than-present rates, saving chemical shippers considerable sums in distribution costs. Inspiring the truckers' plans: flexibility of the bags, which a trucker can roll up when empty, then fill his truck space with profitable return cargo. It's apparent why tank truckers and rail tanker companies resist anything that will help the freight bags along.

Savings and Convenience: Despite lack of a clear-cut ICC decision on just how the bags may be used, the bags have made sizable inroads into conventional-container markets. Their twin appeals — cheaper handling, greater convenience — have helped them score well in the hauling of liquid edibles such as wine, milk, vegetable oils, molasses. And rubber companies that make the bags—Firestone Tire & Rubber Co., United States Rubber Co. (Sealdtank), and Goodyear Tire & Rubber Co. (Van Tanks) —are convinced that shipping edibles will remain an important use for the freight bags.

Chemical shippers have found many uses for the versatile containers. Among them: synthetic resins such as PVC, phenolics and polyethylene, carbon black, phosphoric acid, liquid fertilizers, printing inks, alum, latexes, glues, fish oil, tallow and numerous petroleum products such as lubricating oils, kerosene, diesel fuel.

One difference in the handling of edibles and chemicals: nearly all edibles are handled in bags that have

* American Trucking Assn.'s 27th annual meeting in New York.

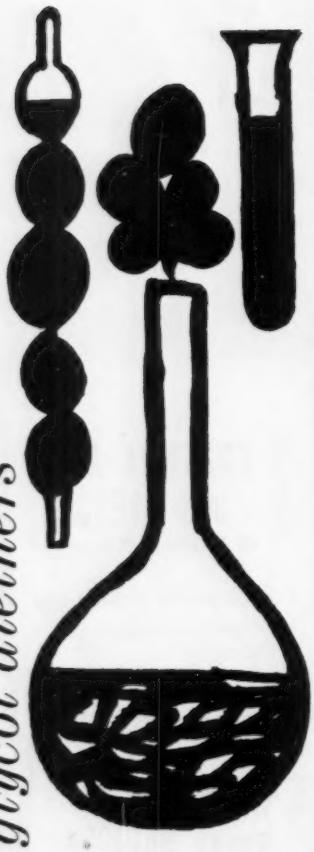
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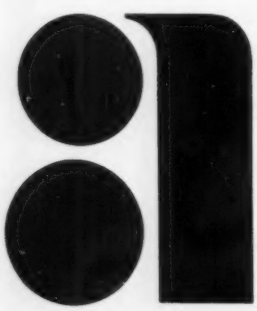
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been lined with transparent polyethylene inner bag to preserve the purity of the contents; and stainless steel fittings are used for most food products.

The savings in using the bags result from handling larger quantities of materials, less labor and unit container cost, and the one-way trip factor whereby a trucker can carry a revenue-producing load on each return run. The latter aspect may mean lower rates on movements, whereas tank truckers' "dead-head runs" often make it impossible or impractical to get a return load for a truck.

Generally a flat-bed truck can carry a rubber tank holding about 3,000 gal. while most tank trucks have 4,000-6,000-gal. capacities. Goodyear now makes rubber tanks that carry 2,750, 4,000 and 4,500 gal., began promoting them for this use in July. (Previously they were used only for storage.) U.S. Rubber makes Sealdtanks in sizes ranging from 450 to 4,200 gal.

The convenience factor is more evident in the case of the larger bags —6,000-13,000-gal. varieties. Besides use on the backs of flat-bed trucks, such tanks can be hauled in boxcars or hopper cars, have also been used for shipboard fuel storage by the U.S. Navy's Bureau of Ships.

Shipper's Concern: In spite of the pressing need for clarification as to who can or should own the bags and who can carry them, ICC decisions so far have done anything but clear things up. In its four examiner recommendations on cases concerning the bags over the past two years, ICC first went on record in favor of the general commodity truckers, later reversed itself, then established a 1,000-gal. limit on the capacity of bags that could be handled by general haulers.

Recently, an examiner recommended a compromise, suggested that general truckers be allowed to handle any of the bags that were filled by the shipper before loading, but not those bags that might be fastened to the truck, converting it into a tank vehicle. This position, say some CPI traffic men, would offer some protection to owners of specialized aluminum and stainless steel tank vehicles, but might be too restrictive on the use of the novel bags.

Unpredictable Outcome: Clearly, CPI shippers would like to see unrestricted use of these flexible rubber containers, and some feel that ICC's upcoming decision—expected within 3-5 months—will allow this.

On the other hand, a greater percentage of traffic men are inclined to feel that ICC will go along with the most recent, compromise recommendation. If it does, shippers will still have to decide who is in a better position to own the bags. Naturally, many chemical shippers prefer not to have to buy or rent them, if some carriers could offer the service; a few prefer to control their own bags for preserving product purity, use them in interplant movements.

But no matter which way the decision goes, bulk distribution methods that promise lower costs will find happy acceptance in the CPI.

Updated Plastic House

After more than three years on display—to over 6 million guests—Monsanto's famous "Plastics Home of the Future" (Disneyland Park, Anaheim, Calif.) is getting some new touches.

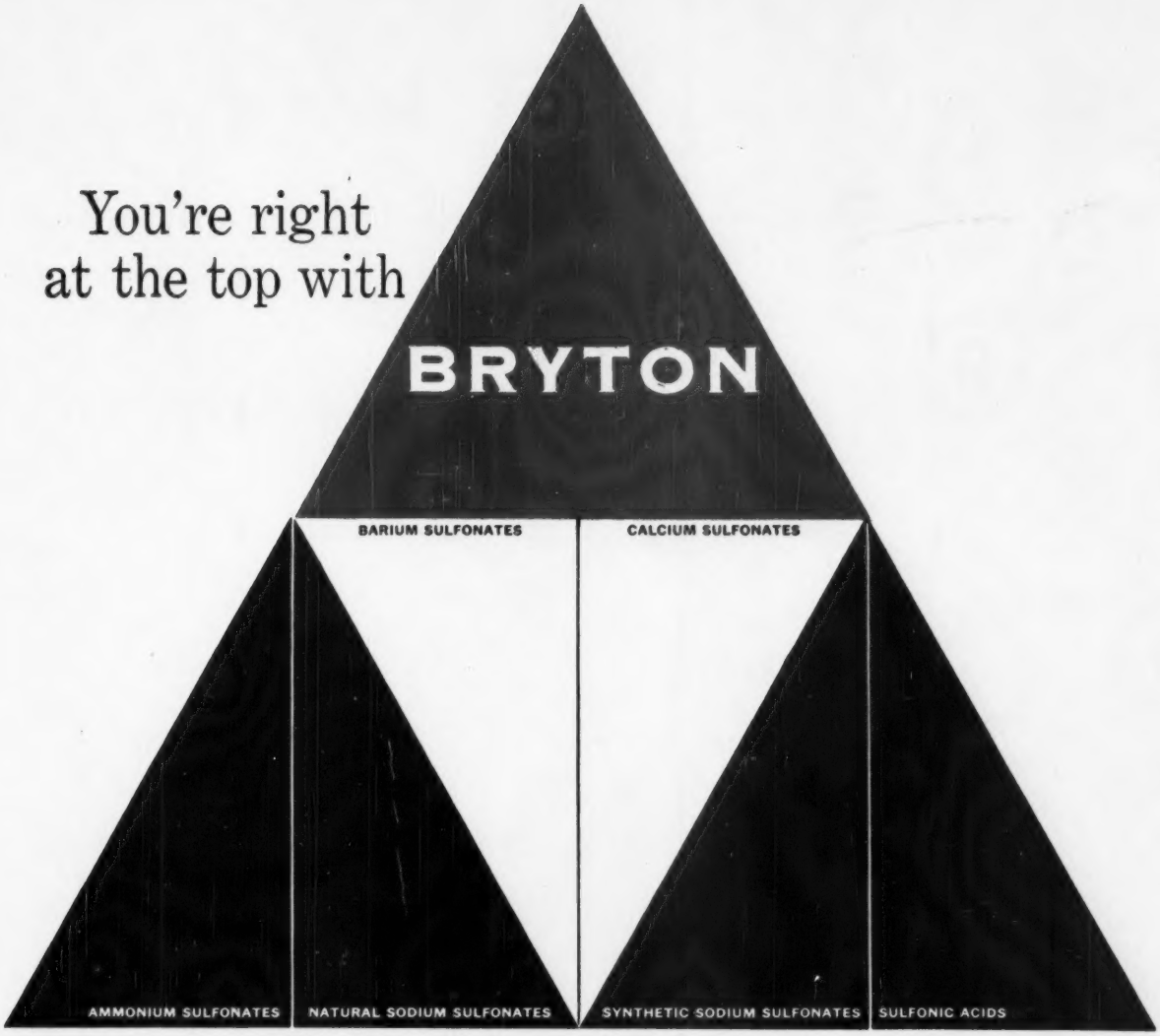
Behind this face-changing: rapid progress in some commercial applications of plastics in residential construction.

The plastic shell has been given a going-over with newly developed exterior latex paint. Inside, many of the plastics finishes have been given a new matte finish—to make them velvety to the touch. And sculptured plastics now have a place inside the model home.

Monsanto has also brightened the furnishings, given them a bit more futuristic styling. Tables, chairs, sofas and floor coverings, now in lighter colors, have been custom-contoured to conform to the graceful curves of the exterior shell.

Sidelight to the refurbishing: Monsanto engineers have recently completed tests and measurements of the house's structural performance since it was built. Their conclusion: it's "outstanding." One index: in more than three years, the four cantilevered wings, which extend 16 ft. from a supporting center core, have settled less than 1/20 in. per year at the outer ends. And the reinforced-plastic skins and rigid foam sandwiched between them show no signs of wear.

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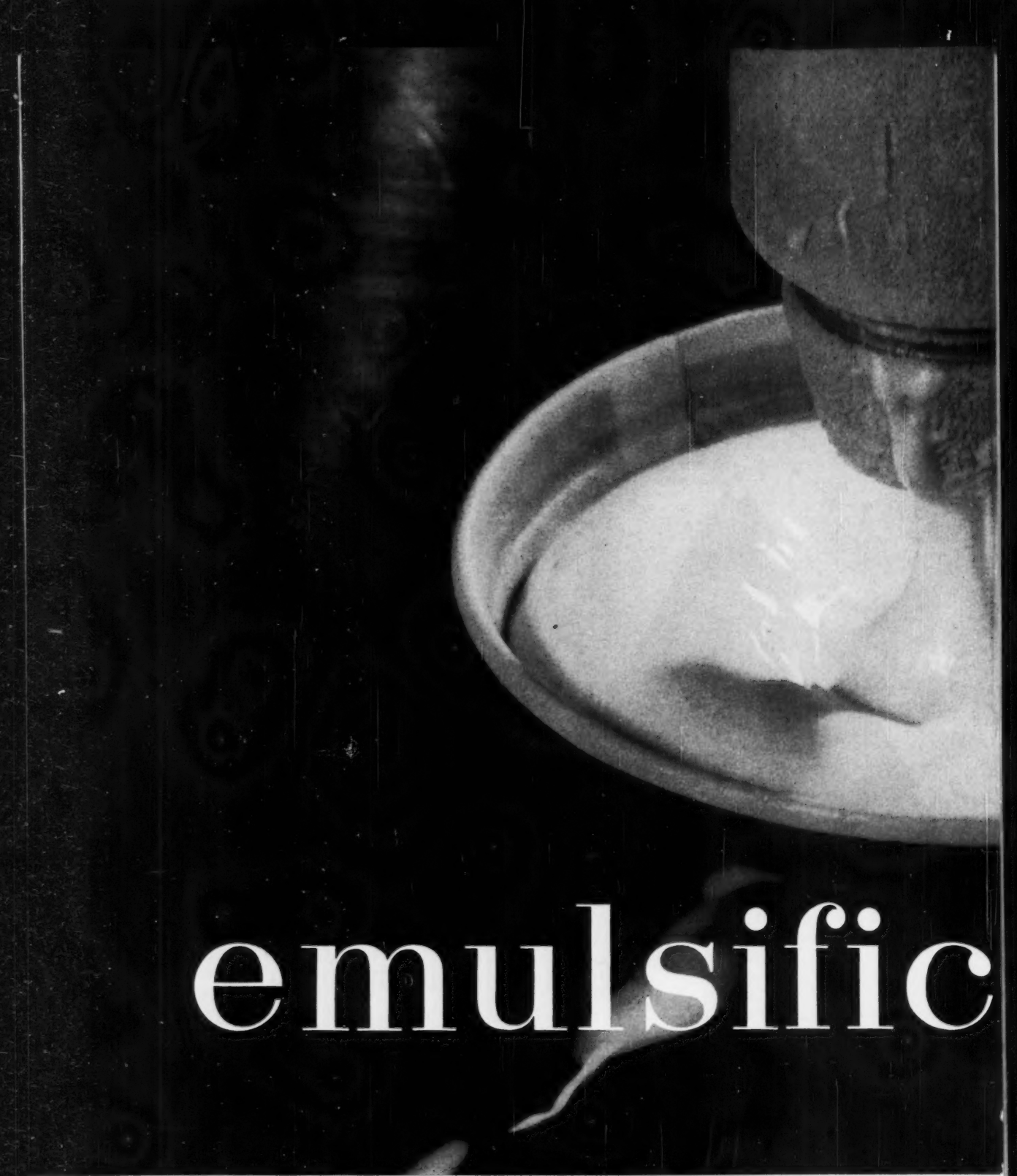
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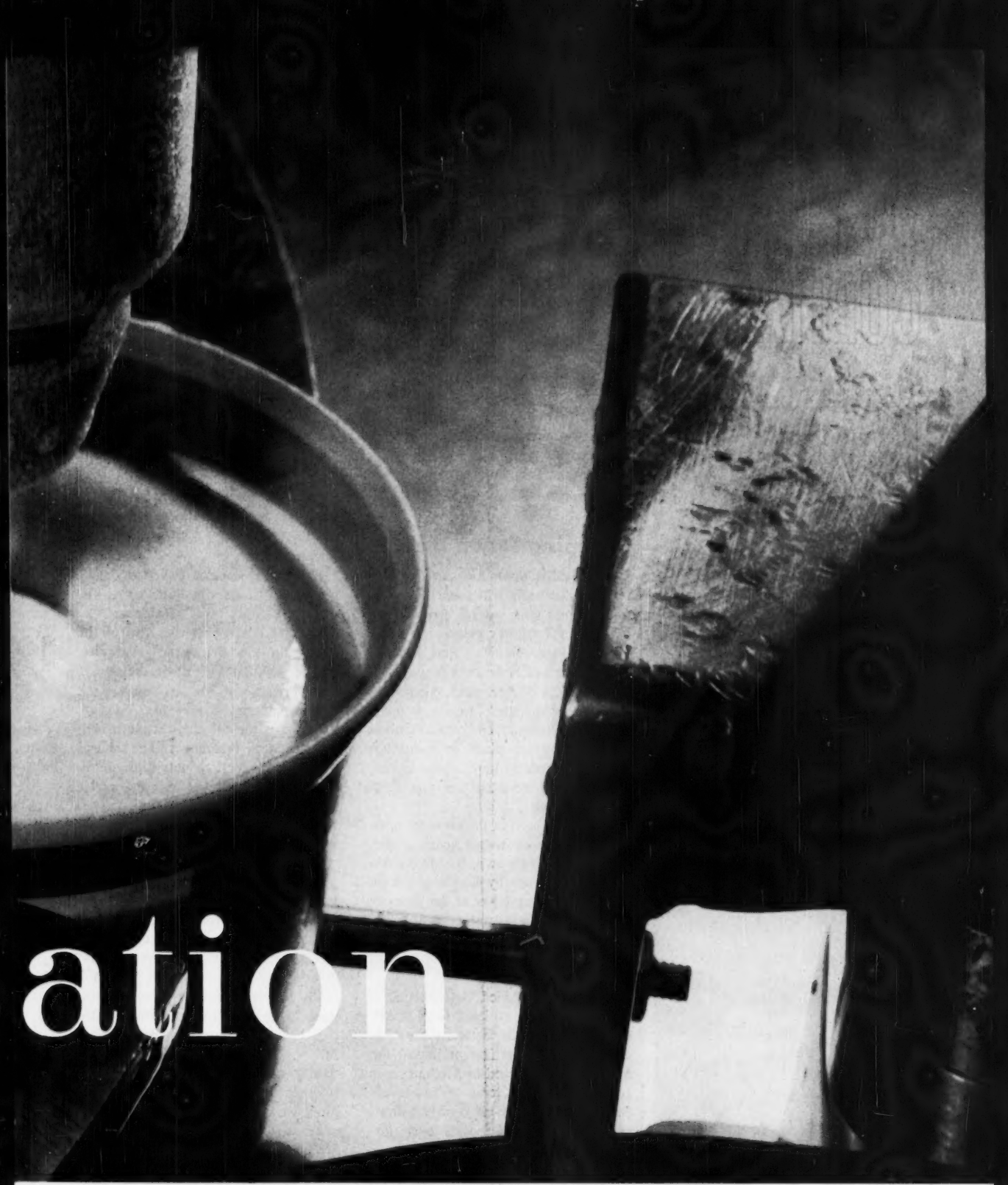
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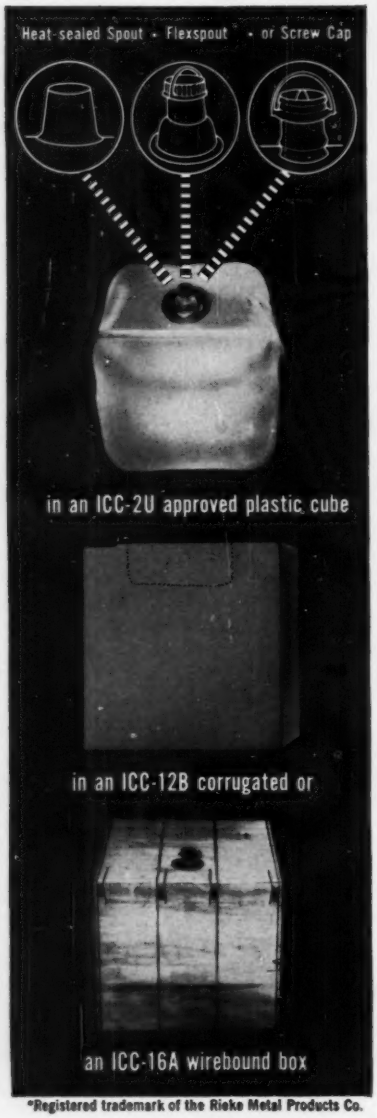


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Chemical Sales Clinic

This week the Salesmen's Assn. of the American Chemical Industry (SAACI) is putting the finishing touches on plans for '60's annual sales clinic. It will be held at New York's Hotel Roosevelt Monday, Nov. 14.

Theme: "How the Company Can Better Cooperate with the Field Salesman." To implement it, Allied Chemical Corp.'s James E. Shand, chairman of the clinic, has arranged to conduct three panel discussions dealing with a salesman's relationships with product management and others within a sales department.

Keynoter for the meeting will be Union Carbide's J. K. Marshall.

Shipping Down Under

Chemical shippers now moving material to Australia will soon find additional liquid bulk storage terminal facilities at several key points.

Allied Petrochemicals Pty., Ltd.—a joint venture of New York-based C. P. Steuber & Co. Inc. and Australia's Ametex (Aust.) Pty. Ltd.—now operates a large liquid chemical terminal near Melbourne, plans to build another soon near Sydney, is considering still other key industrial areas as likely terminal sites.

Allied has been in the terminal business for more than two years, makes no products of its own. Its Melbourne terminal is on nearby Coode Island on the Maribyrnong River at the gateway to Victoria's industrial centers. Current liquid storage capacity of the terminal's 10 tanks: over 1.5 million gal., with more being built.

Steuber and Allied Petrochemicals are counting on at least four tanker shipments annually between the U.S. and Australia. The first of these—the *M.T. Anina*—arrived in Melbourne in June with 6,800 tons of chemicals (some 2.04 million gal.), largest shipment of liquid chemicals ever imported into Australia.

Allied figures the volume of business will grow rapidly. Late this year the firm will inaugurate tanker service to Australia from Europe, Great Britain and the U.S., using a larger tanker — in the 12,000-15,000-tons (approximately 3.6-4.5 million gal.) class.

Exports Look Bright: Although Allied Petrochemicals' terminal ventures seem to augur well for Australia's brisk chemical import business, the company indicates that Australian exports should not be overlooked. Reason: Australia's petrochemical business is maturing rapidly, will soon have sizable quantities of petrochemical intermediates for export. Steuber and Allied are busy now negotiating sales for these products.

More 'Jumbo' Cars

Union Tank Car Co. (Chicago) last week completed delivery of 12 new "jumbo hot dog" cars with 30,000-gal. capacity—largest of any rail-tank cars in the world. The lessor: Esso Standard, division of Humble Oil & Refining Co. Esso will use the cars to haul ethylether from its Baton Rouge, La., refinery.

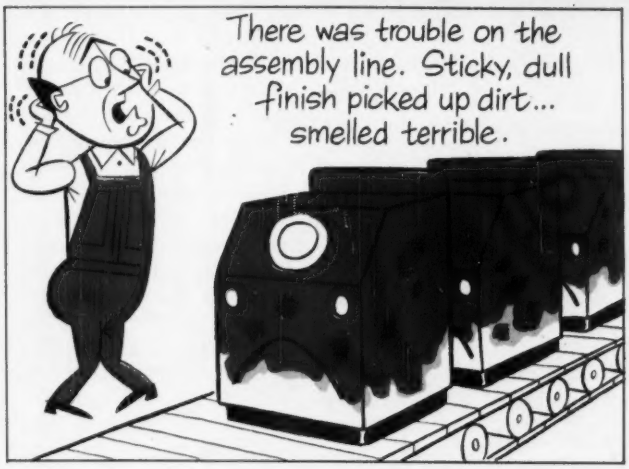
Esso thus becomes the second CPI company to use the huge cars. The other: Tuloma Gas Products Co. (Tulsa, Okla.), which uses two of the cars in liquefied petroleum gas service.

The mammoth, 85-ft.-long cars were built according to Union Tank Car's patented "hot dog" design, which uses the car shell as the principal structural member, rather than as an underframe. Products with densities up to 8.4 lbs./gal. can be carried in these novel cars; heavier materials would make the cars exceed rail load limits.

DATA DIGEST

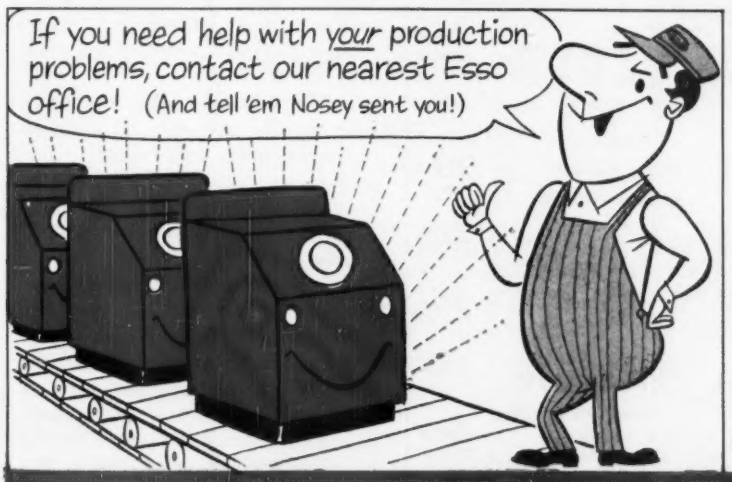
- **Industrial Products:** New folder lists 77 lubricants, petrochemicals and solvents from a stock of over 400 industrial products. Included: hydraulic oils, greases, rubber process aids, waxes and general lubricants. Sun Oil Co. (1608 Walnut St., Philadelphia 3).
- **Packaging Guide:** New edition of reference guide describes steel strapping uses to provide better ways to package, unitize and ship. Signode Steel Strapping Co. (2600 North Western Ave., Chicago 47).
- **Safety Guide:** Booklet provides safety information for storing, handling and fabricating plastic foams in order to avoid ignition. Manufacturing Chemists' Assn., Inc. (1825 Connecticut Ave. NW, Washington 9, D.C.).
- **Advanced Materials Technology:** Condensed resume describes new products and available reference literature

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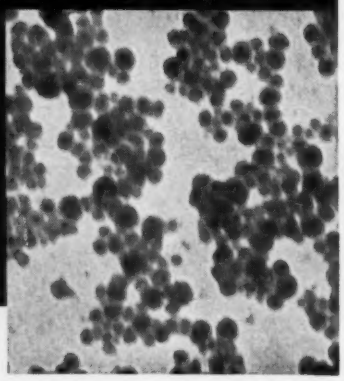
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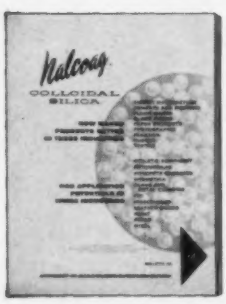
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that has appeared in the past 2½ years. Among the products discussed: silicon carbide, boron nitride, boron carbide, fused refractories, fused magnesium, zirconium, hafnium, hot-pressed alumina and others. Advertising Branch, The Carborundum Co. (Niagara Falls, N.Y.).

• **Tetrahydrofuran:** Bulletin compiles new physical property data on THF, plus information on its use and handling. Properties include solvent power, evaporation and diffusion rates; charts show vapor pressure and density. Some uses of THF are as a resin solvent, reaction and extraction solvent and a chemical intermediate. E. I. du Pont de Nemours & Co., Inc. (Wilmington 98, Del.).

• **Silicones:** Illustrated one-page sheet (CDS-264) describes use of silicones in asbestos insulation blankets, calking, heat transfer media, high-temperature paints and other applications. Silicone Products Dept., General Electric (Waterford, N.Y.).

• **Resin Types:** Technical information bulletin (No. 4) lists physical properties and suggested applications of various olefin polymers. Color-coded data sheets cover high-, medium- and low-density polyethylenes and tailored resins, and high-density ethylene copolymers. Plastics Sales Division, Phillips Chemical Co. (Bartlesville, Okla.).

• **Polyethylene Coating Graph:** New pocket-size adjustable chart shows coating specifications of St. Regis Capcote polyethylene-coated paper needed to provide protection equivalent to that afforded by various coating weights of conventional moisture barriers. Bag Division, St. Regis Paper Co. (150 East 42nd St., New York 17).

• **Sole Leather Impregnate:** Data sheet provides property and use data on resin-polymer blend used to impregnate sole leathers for added water resistance and longer wear. Arthur C. Trask Co. (327 South LaSalle St., Chicago 4).

• **Semiconductor Germanium:** New technical bulletin (HP-102) describes properties, specifications, packaging and availability of various grades of semiconductor germanium. Among them: germanium dioxide, first-reduction germanium metal and intrinsic polycrystalline germanium. High Purity Metals, Inc. (340 Hudson St., Hackensack, N.J.).



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Pumping New Life into Standardization

Centrifugal pump standards are set for final vote after five years in committee.

Long-awaited action should clear the air, spur other chemical process equipment standard groups.

In New York City this week the American Standards Assn.'s 11th annual meeting is holding the spotlight. But for the chemical industry, last week's committee meeting on centrifugal pump standardization has already stolen the show.

After five turbulent years of sparring and wrangling among users and makers of pumps, standardization has now moved a major step forward as a result of the committee meeting. They've settled on two basic pump styles in 12 sizes. Soon, ballots will be mailed for written vote on the decision by all 35 committee members.

The pump committee's progress at last should help clear the air for groups now considering standardization of other types of equipment.

The Issues: Although the committee's progress is admittedly slow, it has been made in the face of considerable argument. On the point of "what's to be gained," proponents of standards say that established pump standards could mean less process downtime and lower spare-parts inventories for chemical companies, result in estimated $6.8-mililon savings (*CW, March 12, '55, p. 48*). Even failure to come up eventually with standards could result in gains. As an engineer at one pump company points out: "The meetings have helped educate users and makers on the needs and desires of each. And that should improve everyone's understanding of pump technology."

However, those opposing standardization contend that it will stifle engineering initiative and cut competition among pump makers—even force some makers out of business. Some pump makers hold that instead of improving the understanding of technology, the standards proposal has caused only strife.

Heated opposition such as this faces any standardization group but the situation is usually cooled by time and discussion.

Slow Steps: And these are significant—if slow—steps, as a quick look at pump standardization history shows. The sectional committee on pump standardization was formed five years ago by the Hydraulic Institute and Manufacturing Chemists Assn. as a result of suggestions by ASA's Chemical Industry Advisory Board (*CW, Apr. 23, '55, p. 89*). After expressing high hopes for quick approval of standards three years ago (*CW, Nov. 30, '57, p. 55*), the committee has lately had to be chary about discussing further progress. And pump makers have been making a noncommittal: "We'll give the customer whatever he wants."

But as it turned out, the big problem was more than merely finding out what the customer wanted. After all other points of contention had been settled reasonably well, the one of pump style remained—and, surprisingly, users and makers were not all lined up on opposite sides. Some users and makers wanted a pump with centerline discharge, others wanted a tangential discharge. Neither style of pump had clear-cut performance advantages over the other, and the committee finally broke the deadlock by recommending standards for both.

No Dictator: In the early stages, the committee pointed out that it was not proposing that parts from one manufacturer's pumps fit the pumps of another manufacturer. Also, hydraulic design would not be affected but pump dimensions would be. By setting certain pump dimensions, it would be possible to pull one pump from a process line for repairs, substitute another maker's pump without rearranging piping or worrying about whether the pump base would fit the foundation.

Standardization in other areas, such as electric motors, pipe fittings and pipe sizes, has undoubtedly helped designers, purchasing agents, operating and maintenance engineers. And it has aided mass production of many items to help cut their selling price.

But some pump makers contend that chemical plant pumps are not in the same category as electric motors. They will never be turned out in sufficient volume to bring the price down to the point where low selling price will overcome the disadvantages of mass production standardization. With electric motors, for example, larger sizes than required to fit the horsepower requirements must often be purchased because there are no standard sizes that fit exactly. But a custom-built motor would be far more costly than an oversize one.

Standardized Savings: At least one case—that of Shell Chemical in Houston—doesn't seem to bear out that pump makers' contention. Instead, it points to savings that may outweigh the disadvantages. Shell has tried designing its own standard pump which it reported last year might be used to replace about 80% of the centrifugal pumps in its plant. Potential savings in installed cost were 20-35% and in maintenance cost, 15-25%. The design was spurred by Shell's experience that the total costs of maintenance and operating exceeded initial pump cost by several hundred percent.

However, in the heat exchanger field, where the attempt to standardize has also begun, there are indications that point to cost advantages for custom over standard design. For example, Esso Research and Engineering found that 62 exchangers out of 141 in existing installations could have been fitted into a standard design category. But to do so would have added 15-20% to the cost.

Wrapped up in Esso's cost picture: compromises on items such as engineering, piping, foundations, power. For example, the compromise on standard design would have meant greater pressure drop through the exchangers, resulted in high power costs.

Many Considerations: As in Esso's heat exchanger case, any consideration of standardization of process

equipment is complex, requires careful engineering study to make certain that there really will be cost savings. As an engineer at one chemical company points out: "Anyone who looks toward standardization with the thought that it will replace engineering judgement had better think again."

But there is no question standardization would simplify the maintenance engineer's job. It is much easier to train a maintenance mechanic to repair one or two designs of any type of equipment than to train him to handle a number of designs. And it cuts down the number of spare parts that must be stocked.

Some companies have attempted to skirt this by settling on one or two suppliers for a particular type of equipment. The major drawback: being tied to one or two sources of supply makes a plant vulnerable in an emergency. Some equipment suppliers have attempted to overcome the objection by locating warehouses close to the plant to offer quick emergency service, help the user cut back even further on spare parts inventory (*CW, Feb. 21, '59, p. 97*).

But limiting the purchases of equipment to one supplier can sometimes get engineers and purchasing agents into hot water with top management unless the choice of supplier can be justified. Company testing laboratories such as Du Pont's Wilmington, Del., engineering test center (*CW, May 16, '59, p. 73*) can help determine which equipment maker's product is the best buy.

Even with standardization, there is no getting around buyer preference for certain manufacturer's products. Sometimes a choice is based on service. And in the chemical industry, where there will always be the potential need for designs to meet the demands of special applications, the equipment company's engineering services will be in demand. Particularly for the smaller chemical companies, the equipment company can be an important aid in helping to decide whether a standard design or a special one will save money, best fits the process requirements.

Many equipment makers would prefer to see standardization in specifications for equipment bids, rather than in standardization of equipment itself. Their point: if the information that is supplied to them by potential purchasers is standardized, they will be able to bid on a uniform basis, give the purchaser a better comparison of bids. Now, purchasers often buy strictly on price, find out later that the cheapest unit won't do the job.

Gains Regardless: Attempts at standardization, even if they fail, usually result in savings at some point along the line. They get engineers thinking about the overall problem of cost. "Sparing of parts often becomes a favorite sport. When standardization focuses attention on cutting down on spares, the need for spares is questioned. Many times they can be cut without standardization," says one refinery engineer.

But where there is a need for standardization, it usually comes after years of give and take on the part of the various factions. It seems to be the only way to develop worthwhile standards that assure no one will be the loser in the long run.

EQUIPMENT

Speed-Variation Guard: Flo-tronics, Inc.'s Electronics Control Division (Minneapolis) is out with an electronic device that automatically stops rotating equipment whenever excessive speed variations occur. Model M300 permits relatively wide variation in shaft speed before it stops or slows the equipment; Model M301 will detect speed variations as small as 1 rpm. The units can be mounted in any position, are available in dust-proof and explosion-proof housings.

•

Delrin Pump: Planet Products (Chicago) is offering a new general-purpose gear pump made of Du Pont's Delrin acetal resin. Major advantages claimed: horsepower requirements reduced as much as 50% and service life doubled over comparable metal models. Delrin's low-friction bearing characteristics result in low heat buildup. Operation is said to be almost noiseless. Pump parts have good solvent resistance and low moisture absorption. Capacities: 2 to 18.5 gpm. Operating pressures: to 100 psi. with non-lubricating liquids.

•

Triplex Pump: Each size of the 7000 series of outside-packed triplex pumps offered by Food Machinery & Chemical Corp.'s John Bean Division (Lansing, Mich.) now has 50% more gpm. displacement as a result of redesign of the fluid end. The pumps have rated capacities from 1 to 90 gpm., operate at pressures from 100 to 10,000 psi. and temperatures to 500 F. Suggested services include: caustic, fatty acids, oils, solvents and salt water.

•

Liquid Gauge: A radiation fuel gauge that can be used for all types of liquid and solid fuels in airplanes and missiles is also being touted for liquid level control in other applications by North American Aviation's Atomics International Division (P.O. Box 309, Canoga Park, Calif.). Gamma rays given off by the gauge's radiation sources pass through the liquid-holding tank. Intensity of the rays reaching detectors mounted on the tank indicates the liquid level.

•

Hose Clamp: A hose clamp that has no perforations through the band to cause extrusion or scuffing of rubber is a new product of Aeroquip Corp.'s Marman Division (11214 Exposition Blvd., Los Angeles 64). The clamp's steel screw engages on coined threads that prevent snap opening and loosening. Uniform pressure by the clamp won't distort tin-wall tubing. The clamp is easily removed, has a high-strength band that permits wide-diameter adjustment.

•

Seamless Tubing: Uniform Tubes, Inc. (Collegeville, Pa.) is now offering fine grades of Nichrome V (80% nickel, 20% chromium alloy) tubing for resistance-heating elements, thermocouple-protection tubes and instrument components. The tubing withstands temperatures to 2,100 F, is available in 0.010- to 0.375-in. outside diameters with wall thickness down to 0.0005 in.

•

Portable Thermistor Thermometer: Yellow Springs Instrument Co. (Yellow Springs, O.) is out with a new battery-powered, remote-reading, continuous-indication thermistor thermometer. The unit is portable, can be used to measure the temperature of liquids, equipment surfaces, humans. Ranges: —40 C to 150 C and —40 F to 300 F. Readabilities: ±0.2 C and ±0.25 F. Accuracies: ±0.5 C and ±1 F.

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Density Gauge: Beckman Instruments, Inc. (2500 Fullerton Road,



Low-cost IBM 1620 solves gasoline blending problem

DETERMINES WHICH COMBINATION WILL RETURN THE MOST PROFIT

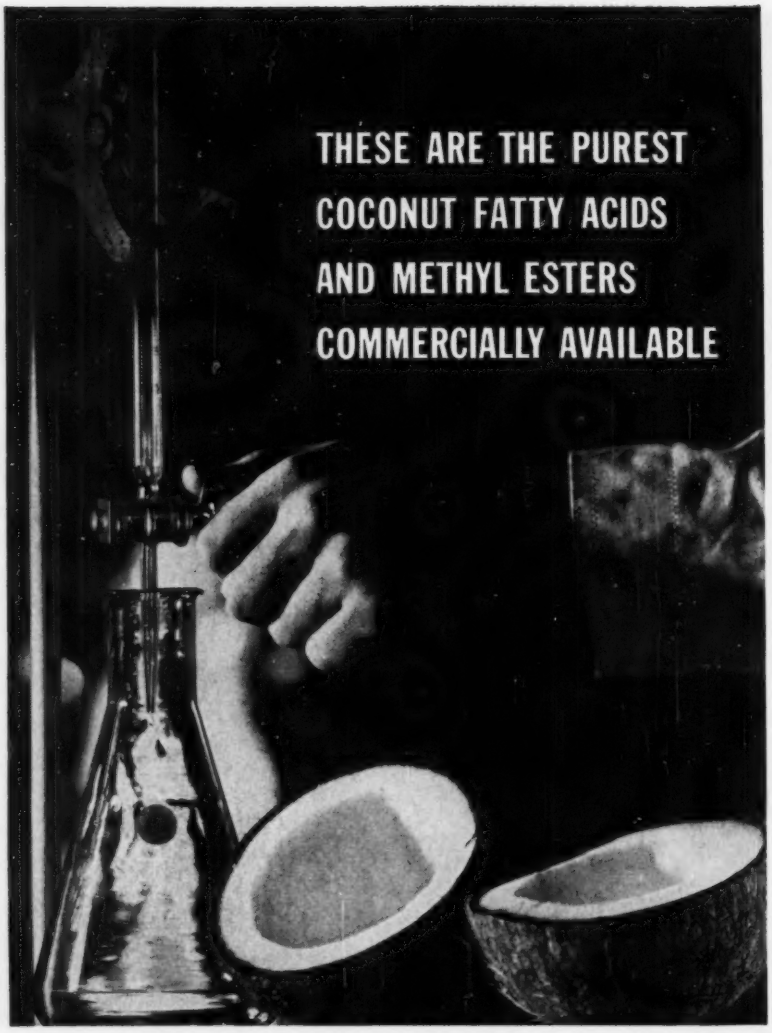
The low-cost IBM 1620 Engineering Computer takes into account possible solutions to a blending problem and computes your most profitable operating plan.

The IBM 1620 prints out a complete description of its optimum solution, giving you the flow rates, unit severity levels and product compositions which should be used for the most profitable operation. Each variable in the system is accounted for, with complete cost ranges to indicate the sensitivity of your system to the initial cost and product data.

Using linear programming techniques, the 1620 adapts efficiently to changes in your system. These techniques will be made available without cost to IBM customers later this year. This is another example of Balanced Data Processing . . . machines supported by complete services. For information about the IBM 1620 and the special advantages it offers for blending and other important petroleum applications, call your local IBM representative. Like all IBM equipment, the 1620 computer may be purchased or leased.

THE IBM 1620 is an economical, desk-size engineering computer with features previously found only in larger systems. It offers solid state design, magnetic core storage and high-speed internal computing performance. Its versatility and ease of operation recommend it for such petroleum industry applications as distillation problems, unit correlations, evaluation of options and determination of equipment efficiency.

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At Foremost-El Dorado, where we concentrate on manufacturing coconut fatty acids and methyl esters exclusively — purity is foremost. We produce the purest commercially available. For example, our Lauric and Myristic acids and esters are over 98% pure. More important, these high standards of purity are constantly uniform. Reason why hundreds of companies from coast to coast have been depending on Foremost-El Dorado shipments for over 65 years. We ship to your requirements — in drums, bags, and in tank cars. Also mixed compartment tank cars of acids and esters. Supplies near you to meet your deadline.

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Lauric	*Eldhyco**	*Caprate*	*Eldo* 18*
Myristic	*Coconut*	*Laurate*	*Coconate*
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PRODUCTION

Fullerton, Calif.) says its new pycnom-ter streamlines density measurements, cuts determination time from hours to less than one minute. The instrument measures true volume; density is determined by comparing the weight of the sample to the volume reading. The unit operates mechanically, requires no electricity, is portable, weighs 14 lbs.

•

Insulating Tape: A new laminated insulating tape with Teflon FEP on one side and glass cloth on the other is an offering of International Resistance Co.'s Plastic Products Division (401 N. Broad St., Philadelphia 6). Thickness of Teflon and the type of glass cloth may be varied. First of the tape series, called Lamoflex Type TG, to be offered has 0.002-in. Teflon on 0.002-in. glass cloth, is available in ½- to 6-in. widths. Price for a 36-yard roll of 1-in. wide tape is $14.47.

•

Circuit Breaker: I-T-E Circuit Breaker Co. (1900 Hamilton St., Philadelphia) is out with a new line of low-voltage, current-limiting circuit breakers for protection against electrical fault currents up to 20,000 amps. The new K-Don breakers combine in one switchgear compartment the fast-acting, high-capacity fault protection of current-limiting fuses and the protective features of the company's K-Line stored-energy breakers. The breaker can be used to replace existing breakers where available short-circuits exceed interrupting capacity, to protect panelboards with limiting interrupting capacity, and to protect low-voltage bus duct with limited short-circuit withstand capacity.

•

Trace Oxygen Analyzer: An electrolytic cell for analyzing trace quantities of oxygen in streams of inert gases (e.g., nitrogen and argon) is a new product of Thermco Instrument Corp. (U.S. #20, La Porte, Ind.). The cell will measure as little as 0.3 ppm. of oxygen, has an unusually fast response to change—less than one minute for 90% change. No change in instrument setting is required when switching from nitrogen to argon gas streams. The unit is available with three double sets of ranges: 0 to 20 ppm. and 0 to 100 ppm.; 0 to 100 ppm. and 0 to 500 ppm.; 0 to 200 ppm. and 0 to 1,000 ppm.

BUILD SPECIAL PROPERTIES INTO "TAILOR-MADE" POLYMERS WITH VINYLPYRROLIDONE

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These are some of the many properties which may be "built into" copolymers to meet specific needs.

Vinylpyrrolidone, a versatile liquid monomer, copolymerizes readily with other monomers. Vinylpyrrolidone also reacts with phenols to form valuable addition compounds.

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For additional information on handling properties, copolymerization procedures, etc., write for Bulletin No. AP-86.

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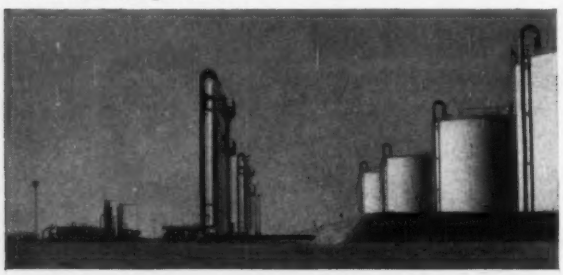
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ENGINEERS AND CONSTRUCTORS FOR INDUSTRY

NEW PROCESSING PLANT AT HASSI-MESSAOUD STABILIZES 150,000 B/SD OF LIGHT CRUDE

The S. N. REPAL permanent field processing plant at Hassi-Messaoud, Algeria, is now operating at its capacity of 150,000 barrels per stream day of stabilized crude oil. The installation gathers, degasses, stores and transports a very light crude (0.8 sp. gr.) produced at the four-year-old Hassi-Messaoud field and destined for the Haoud El Hamra-Bougie pipeline to the Mediterranean. It was built by Societe Francaise des Techniques Lummus in this remote location, under extreme climatic conditions, in less than nine months from the time materials began to arrive at the site—and was completed ahead of schedule.

General view of the Hassi-Messaoud plant, showing vertical, third stage separators (center), part of horizontal separators, and four intermediate storage tanks.



Rear view of control house with its specially-designed roof for Saharan climatic conditions.



In May, 1958, Societe Francaise des Techniques Lummus was assigned the task of planning, engineering and constructing the plant, the primary purpose of which is to remove the very large quantities of natural gas associated with the Hassi-Messaoud crude (gas: oil ratio by volume is about 200:1). A temporary installation handling limited crude capacity existed at the site when the Lummus company was called in.

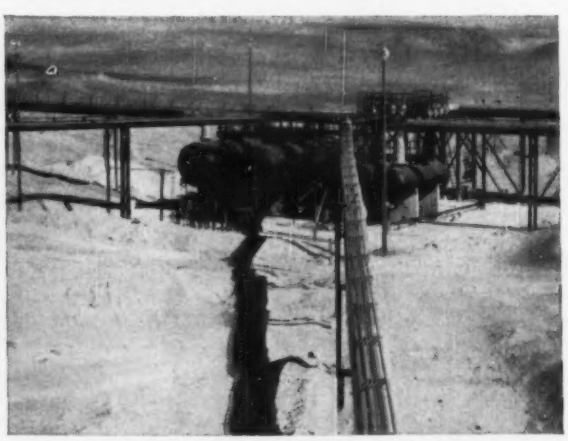
By September, 1958, plans were completed and purchasing began. Almost all the materials were bought in France or Algeria. However, electronic control apparatus was obtained in the United States. Over 4,000 tons of material were transported across the Mediterranean Sea, the Atlas Mountains, and the desert to arrive at a rocky plateau rising about 100 feet above the old dry valley of Oued Irara.

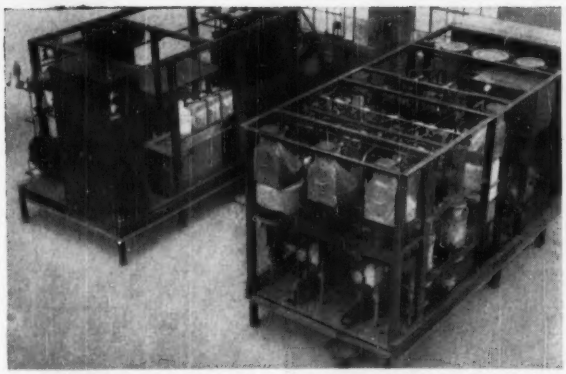
In addition to transportation difficulties, Societe Francaise des Techniques Lummus had these handicaps to overcome during construction proper, which got underway in January, 1959: a water table lying 150 feet deep, which posed problems in electrical grounding of equipment; conducting the major part of the work during the hottest months, with temperatures ranging from 104-130°F.; violent sand and dust storms, characteristic of the area.

In spite of the problems, on September 24, 1959 —ahead of schedule—the gas separators were put into operation and the flares lit. The first shipments through a 16-inch pipeline to Haoud El Hamra Terminal, 19 miles away, began shortly thereafter.

SFTL is one of the seven International Groups of Lummus companies which circle the globe to serve the process industries wherever plant design, engineering and construction are needed.

The condensate drums and control station with the high and low pressure flares.





Two skids hold complete nitrous oxide plant ready to move to location in "flying boxcar."

Portable Nitrous Oxide Generator Being Constructed for U. S. Army Engineers

Design, construction and testing of a portable nitrous oxide generator for the U.S. Army Corps of Engineers is being carried out by The Lummus Company at its Engineering Development Center, Newark, N. J.

The plant will afford a field supply of 40 lb. per hr. of liquid anesthesia for use under combat conditions, at a cost of about $250,000 per generator. The process, specified by the Army, is conventional decomposition of ammonium nitrate by heat. Ammonium nitrate can be shipped in bags, eliminating the return of empty anesthesia cylinders which presently causes problems.

Dimensions of the unit were dictated by the size of the rear door of a "flying boxcar". As designed, the plant is mounted on two skids, eight feet square by 20 feet long. It has shock and thrust resistance for portability by plane, train or truck. It is simple enough for operation by soldiers getting instruction from a manual.

The nitrous oxide product meets USP purity requirements.

The equipment in the unit includes:

On the first skid

Ammonium nitrate melting pots of aluminum.

Decomposition vessels of aluminum.

Caustic, sulfuric acid and steel wool scrubbers made of glass-fiber-reinforced polyester resin. Packings for the caustic and acid scrubbers are polyethylene Tellerettes.

On the second skid

Compressor of a type that compresses gas by flexing a diaphragm with hydraulic fluid.

Hot KOH absorber.

Desiccator.

Liquefier – a 1¼-ton fluorinated hydrocarbon refrigeration unit.

Stripper.

Bridging the two skids

A plastic gas-surge bag of 300 cu. ft. capacity which weighs only 30 pounds and folds up into a small bundle for storage. It consists of an inner envelope of vinyl plastic sheeting and an outer casing of vinyl-impregnated nylon fabric. It was specially designed for this portable plant.

Because parameters set by the Army pose many problems in selection of materials of construction, selection and positioning of equipment and instrumentation, Lummus' Engineering Development Center will provide the Army with an R&D prototype unit which may save them a great deal of expense and inconvenience.

Over a half-century of Process-Industry experience

Here is just a partial list of chemicals for which Lummus has designed, engineered or constructed plants:

Acetone	Dichlorethane	Nitric acid
Acrolein	Dichlorobenzene	Phenol
Allethrin	Di-isobutyl alcohol	Phthalic anhydride
Ammonia	Ethylbenzene	Polyvinyl alcohol
Ammonium nitrate	Ethyl chloride	Polyvinyl pyrrolidone
Ammonium sulfate	Ethylene	Propargyl alcohol
Benzol	Ethylene glycol	Propylene
Beryllium metal	Ethylene oxide	Pyrrolidone
Bisphenol	Epon® resin	Styrene
Butadiene	Formaldehyde	Sulfuric acid
Butanediol	Heavy water	Surfactants
Butynediol	Hydrogen	Tetramer
Butyrolactone	Hydrogen sulfide	Trichlorethylene
Carbon black	Isopropyl alcohol	Trichlorobenzene
Caustic soda	Lamp black	Toluene
Chlorobenzene	Magnesium sulfate	Uranium oxide
Cumene	Mercuric nitrate	Vinyl acetate
Di-ammonium phosphate	Naphthalene	Vinyl pyrrolidone

Discuss your next chemical or petrochemical project with a Lummus representative.

THE LUMMUS COMPANY, 385 Madison Avenue, New York 17, N. Y.; Houston, Washington, D. C.; Montreal, London, Paris, The Hague, Madrid. **Engineering Development Center:** Newark, N. J.

FMC selects Lummus as principal sub-contractor on new Army Chemical Corps Contract

A new Army contract for a Chemical Corps production facility near Newport, Indiana, in excess of $13,000,000, has been awarded to the Food Machinery & Chemical Corporation. The contract calls for the design, construction and test operation of a plant to produce classified material. The Lummus Company has been selected as principal sub-contractor to design, construct and assist in test operation. Food Machinery & Chemical Corporation have the responsibility for operating this government-owned contractor-operated facility for some period to follow.



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You'll sell more paint with these solvents . . . preferred for low odor and odorless products.

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Shell Sol 140 . . . a high-flash, slower drying solvent with unusually low odor.

Shell Mineral Spirits . . . traditional distillation range, solvent power and drying. Mild odor.

Typical properties of these Shell Solvents are contained in booklet shown. It will be mailed on request.





FACT—FROM SHELL RESEARCH

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SHELL

Technology
Newsletter

CHEMICAL WEEK
October 29, 1960

The efficiency of standard sulfur dioxide converters in contact sulfuric acid plants can be boosted by a pelletized catalyst developed by Von Bree, Inc. (Newark, Del.). The new catalyst, called Code 816, is added in layers about 2 in. thick on top of the existing 10-20 in. of standard vanadium pentoxide catalyst.

This allows operators to take advantage of a lower inlet temperature (about 700 F). Due to the exothermic reaction, the temperature rises across the Code 816 catalyst bed until it enters the vanadium catalyst at about 880 F. Experience in operating plants running at 150% of capacity has shown the addition of a layer of Code 816 will up the conversion from 95% to 96-97%

•

Commercial-scale purification of uranium-233 for the first time by private industry will be performed by W. R. Grace & Co.'s Davison Chemical Division at its Erwin, Tenn., nuclear materials plant. Process: acid-dissolving and solvent-extraction. Originally, the U-233, which will be used in the Advanced Epithermal Thorium Reactor that Southwest Atomic Energy Associates is building at Canoga Park, Calif., was to have been supplied in purified form by the Atomic Energy Commission. Davison was to convert it into oxide and fabricate aluminum-clad platelets for North American Aviation Corp.'s Atomics International Division, prime contractor for the reactor.

•

The first European company to use new phthalic anhydride process by Scientific Design, employing a catalyst that takes either napthalene or orthoxylene feed stock, is Compagnie Francaise des Matieres Colorantes (Francolor), at Vilers-St-Paul, France. Although designed for an *o*-xylene feed, the Francolor unit will be fully convertible to use of naphthalene.

•

Now they're testing fibers with a cannon. Fiber Research Laboratories, Inc. (Dedham, Mass.), has scaled up its ballistic test for fibers (*CW, Jan. 16, p. 55*), now uses a 75-mm. cannon and special ultrahigh-speed photographic equipment to simulate high-impact strains on parachute cord (e.g., for missile and nose cone recovery), jet plane arrestation nets, and the like.

FRL developed the $79,000, 30-ft.-long ballistic range for the Air Force's Non-Metallic Materials Laboratory, Wright Air Development Division (Dayton, O.). It's valuable for testing large samples having up to 10,000-lbs. static strength, permits precise measurements leading to accurate calculation of stress-strain data. And it supplants the less accurate, expensive and time-consuming rocket sled tests previously used for heavy impacting of parachute components.

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Flameproofing olefin polymers by a new method is covered in Australian patent application 55,554/59 to Farbwerke Hoechst. It in-

volves addition to the polymer of octachlorodiphenylene dioxide, and at least one oxygen or sulfur compound of an element (having an atomic weight of at least 74) of Group V of the periodic table.

•

The first liquid and solid alum process based on continuous, pressurized digestion of bauxite ore burst out of Chemical Construction Corp.'s pilot plant last week. This breakthrough ends the race between several firms to achieve commercial application of a laboratory gem. Savings of 15% in investment, 10-15% in labor and production result from smaller equipment, fast action and lower acid and utility usage. A 60-tons/day plant now requires three 16 x 16-ft. digesters, while the new process works with one 5 x 16-ft. horizontal autoclave.

Several companies have experimented with a pressurized digestion process, but Chemico is the first to overcome the corrosion problems. Its autoclave still needs a relining every two or three years but requires much less acid-brick. Four other advantages: (1) processing time is cut from nearly three days to three hours; (2) a relatively coarse feed is workable in the equipment, reducing the grinding and material-handling costs; (3) units as small as 5-, 10- and 30-tons/day capacity are available; (4) the new autoclave can be installed in existing processes to replace batch digesters.

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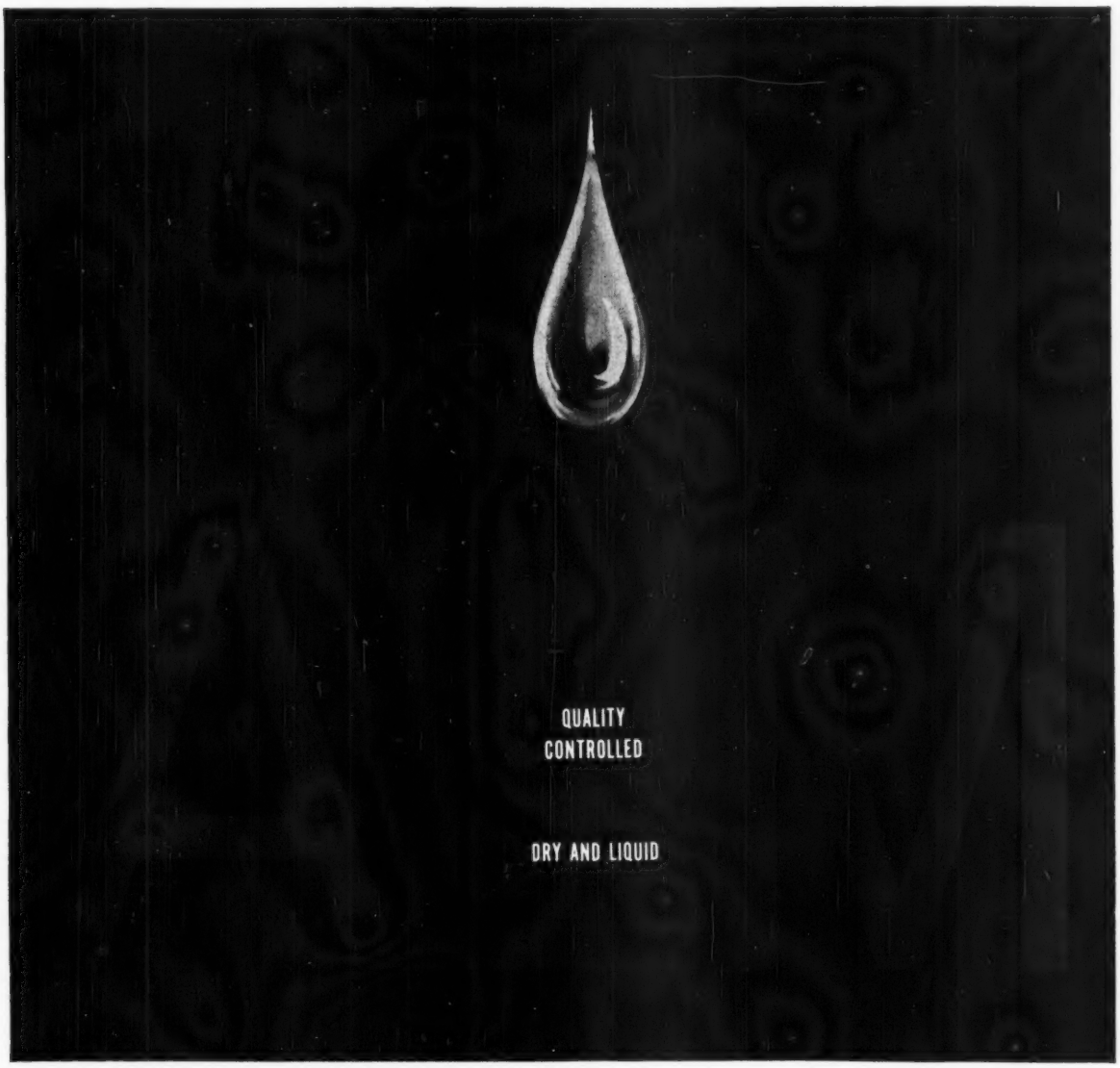
A new polyamide treatment to shrinkproof wool has been developed by the U.S. Dept. of Agriculture's Agricultural Research Service in Albany, Calif. Wool is immersed in dilute diamine (e.g., hexamethylene diamine), then in dilute diacid (e.g., adipic) chloride to form a thin, durable film on the fiber surface. This can be done with commercial equipment, USDA believes, without affecting the fiber's natural soft texture. Treated garments survive repeated washing and drycleaning without damage.

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A low-cost way to make electrically conductive glass is now claimed by Soviet scientists. Glass is heated almost to melting point, treated with tin chloride to form a thin film of tin oxide on the glass surface. While the glass loses a small degree of transparency and becomes slightly iridescent, it can be used for automobile and airplane windshields. Low-amperage electricity passing through the glass heats it enough to prevent formation of ice or condensate.

•

Direct distillation of fresh water from sea water gets the nod at Shell's Caracas, Venezuela, installation. Key to its low-cost operation is use of waste process steam. The low-pressure steam will be used to convert 20,000 gal./day in a unit costing about $1.4 million. Incoming sea water is first heated in exchange against the condensing fresh water, then by direct steam injection. Partial vacuum, pulled by steam injectors, flashes out fresh water at about 108 F. About one part in 13 of the incoming sea water is converted into fresh water product.



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producer of alum for over half a century – is particularly well geared to supply all your alum requirements. Stringent quality controls are exercised from start to finish. Manufacturing plants are strategically located throughout the country to assure prompt, efficient service.

Advantages of liquid alum. More and more firms are becoming interested in liquid alum which Cyanamid pioneered. Material costs are lower – so are costs of unloading, storing and handling. Liquid alum requires simpler, easier-to-maintain feeding equipment – less storage space. And it disperses more rapidly in water providing more effective coagulation. But liquid or dry, you can depend on Cyanamid for all your alum needs.

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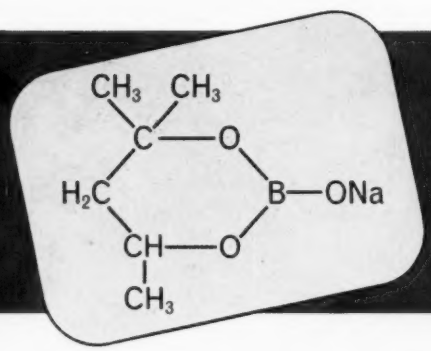
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WHAT'S AHEAD FOR REICHHOLD?

Beaming over the outlook, Henry Reichhold—founder, president and general manager of Reichhold Chemicals, Inc., internationalist, humanitarian, "maverick" of the chemical industry, and world traveler extraordinary—jets out of New York's International Airport next week for another profit-reaping swing through Europe.

It will be the second extensive European trip for Reichhold this year, and, like the first, this will be no pleasure jaunt. His mission—to discuss possible license arrangements for newer RCI products with heads of overseas chemical companies—will take him to England, Holland, Switzerland, Germany, Finland, Sweden, Norway, Italy, France and Austria.

Reichhold will also inspect possible sites for new plants, drop in on the fabulous Berlin Academy of Arts that he donated to the people of West Berlin, attend



CW PHOTOS—ED WALLOWITCH

Budget a serious matter: Chairman Goetz, Reichhold.



Executive Vice-President Baum; Honorary Chairman

ground-breaking ceremonies of new RCI-associated plants in France and Switzerland, and personally apply a knowledgeable finger to the pulse of today's booming European chemical industry.

The 59-year-old RCI chief's crowded agenda points up two revealing facts: the worldwide network of Reichhold-affiliated chemical and synthetic resin companies is on the verge of another significant growth surge; Henry Reichhold is still the dynamo who powered the growth of a penny-ante enterprise into a multimillion-dollar chemical complex.

When RCI "went public" with a first offering of 200,000 shares of common stock in '56, the mantle of one-man control slipped a little from Reichhold's ample shoulders. A tight competent board of directors and top-flight executive and finance committees now help manage the corporate reins, but Henry Reichhold continues to exert a powerful influence on the destiny of the burgeoning corporation.

A measure of his success: latest available figures show that RCI net sales in the first eight months of '60 were $65,759,000 as against $62,301,000 in the comparable '59 period. RCI net income, in the face of a national climate of shrinking profits, was up 17.2% ($2,343,000 vs. $1,999,000). August sales, almost $9 million, were the highest for any one month in the corporation's history. And this month RCI pays another cash dividend of 15¢/share on its common stock.

Logical Follow-up: Some of the new license and royalty deals Reichhold hopes to arrange in Europe will be for molding compounds, plasticizers, glass fibers and glass fiber products—lines produced by three companies recently acquired by RCI: Alsynite Company of America,* Deecy Products Co. and Modiglass Fibers, Inc. All moved into the RCI fold since the first of the year through swap deals involving shares of Reichhold common stock.

The moves brought Reichhold into the completely new (for RCI) field of producing and selling "finished" plastic products, a radical departure from Henry Reichhold's once-firm position of being solely a raw-material supplier to the industry. To bolster its new interests, RCI this week is launching a million-dollar sales and promotion campaign with which it hopes to slice out a major chunk of the plastic-reinforced corrugated and translucent panel market.

World Traveler: Henry Reichhold (generally referred to as H.R.) is as much at home abroad as he is in the U.S. and as familiar with day-to-day operations of his foreign affiliates as he is with domestic RCI affairs.

Illustrative of the scope of these far-flung interests was the six-week whirlwind tour of the European Common Market made by Reichhold earlier this year.

While abroad, Reichhold attended stockholders' meetings of some of RCI's associated companies including Reichhold-Beckacite S.A. (Paris); Reichhold Chemie AG.

* Included in this acquistion were Alsynite Company's assets and business in the Alsynite companies of California, Ohio and New Jersey; Everlite Corp.; Plastikool Awning Corp.; Ray-O-Lite Corp. of America; and Chemiglas, Inc. All these now make up the Alsynite Division of RCI.



O'Connor; Administrative Vice-President Mason.

(Hamburg); Reichhold Chemie AG. (Zurich); Reichhold Chemicals Ltd. (London); Reichhold-Beckacite AG. (Vienna). Since then all Reichhold interests in Austria have been consolidated into Reichhold Chemie AG.

A huge, rumpled man of inexhaustible drive, Reichhold also checked on the construction progress of the new RCI Swiss and French plants; presided at the opening of a new research and development building in Switzerland and a new R&D "Plasticenter" in Hamburg.

In Holland, he completed the purchase of a large tract of land in s'Hertogenbosch for a resins and chemical plant, and formed Reichhold Holland to operate the unit. The new company will also handle all Reichhold imports from the U.S. to the European Economic Community.

In Munich, Reichhold completed plans for the manufacture in the U.S. of vinyl acetate monomer under a license agreement with Wacker-Chemie GmbH. and was filled in on details that will put RCI into European petrochemicals production. The German RCI subsidiary, Reichhold Chemie AG., will join with giant, oil-refining Deutsche Erdol AG. (Hamburg) to construct a petrochemicals plant at the North Sea port of Brunsbuettelkoog. The new installation will be handy to DEA's refinery at Hemmingstedt and to shipping facilities for serving Reichhold's many foreign plants and customers. Production is slated to begin next year, under the aegis of a new company to be mutually owned by Reichhold Chemie and DEA. (The Brunsbuettelkoog area is one that Reichhold will scout for suitable expansion property on his upcoming trip.)

Nexus of RCI's worldwide organization is the corporation's sumptuously carpeted executive headquarters* and international sales office at White Plains, N.Y., some 30 miles from the heart of Manhattan. At headquarters today, talk has a strong flavor of corporate growth.

Some of the developments you will be hearing more about over the next couple of months:

- Startup of a second RCI maleic anhydride plant at Elizabeth, N.J. The unit, when completed, will cost about $4 million and have a capacity of 20 million lbs./year.
- Completion of a 30-million-lbs./year phenol expansion at Tuscaloosa, Ala., that will boost size of the present plant to about 90 million lbs./year.
- A construction start on RCI's fourth phthalic anhydride plant, this one at Newark, O. Capacity will be 60 million lbs./year, with production expected to begin in late '61. (Other Reichhold phthalic plants are at Elizabeth, N.J., Detroit, and Azusa, Calif. The 30-million-lbs. Elizabeth plant started producing in Feb. '60.)
- Start of construction on a Houston, Tex., plant to produce vinyl acetate monomer, a new area of competition for RCI resulting from the Wacker Chemie licensing deal. Initial capacity of the installation will be 50 million lbs./year, with provision for doubling later.
- A Reichhold move into major melamine production, after a cautious semicommercial operation that will turn out perhaps 5 million lbs./year. Location will be on the firm's recently acquired (from U.S. Metals Co.), 40-acre tract at Carteret, N.J. Proposed plans call for a melamine capacity increase to 25-30 million lbs./vear, then a further increase, as demand develops, to 60-100 million lbs.

Proposed, too, to round out integration plans at Carteret, are facilities to produce methanol, oxo chemicals, urea, other chemical intermediates and plants for making phenolic-molding and melamine-molding compounds.

In Europe, Reichhold Chemie (Switzerland) starts phthalic anhydride production this month in the 20-million-lbs./-year plant at Hausen bei Brugg, and Reichhold-Beckacite (France) will soon be turning out maleic anhydride in a new, 10-million-lbs./year plant at Niort.

And just a couple of weeks ago there was a significant South American development that further spreads RCI's influence on that continent. A license agreement was signed with Compania BAO. S.A. (Montevideo, Uruguay) for the manufacture of RCI surface coating, adhesive, laminating and other resins.

Growth on Growth: Acquisitions, contemplated expansions into broader chemical raw-material and finished-product ventures, and moves into newer resin fields—polyethylene and vinyl chloride are definite possibilities—could soon lift RCI into the realm of the majors.

With just a hint of restraint Henry Reichhold spells out

* Where even the fire escapes are carpeted. The two-story building was formerly the home office of Alexander Smith Carpet Co. Prior to signing a long-term lease for sole occupancy in '56, RCI rented quarters on the second floor.

that hope. "Our domestic sales," he says, "are running at about $100 million/year now. In three years, the figure should be about $250 million, and I expect that before 1970, we will be at the $500-million mark."

Doubling, redoubling and redoubling again has been the pattern of growth in the 35 years of RCI's existence. In '38, for example, the company's sales were slightly above $3.2 million. That was the year a hustling young Henry Reichhold reorganized (under the laws of Delaware) and changed the name of his company to Reichhold Chemicals, Inc., from Beck, Koller & Co., under which he had been doing business in Detroit for some 13 years.

In the decade to '48, reports Ralph Urich, hard-plugging vice-president and general sales manager, RCI sales increased 10-fold, to about $31 million. In the subsequent 10-year period, business had climbed to a shade higher than $74 million annually.

In addition, more and more RCI-associated foreign companies were moving products at a $55-million/year clip by '58. (These sales, of course, are not consolidated in RCI financial reports. Income to RCI from foreign associates, explains Administrative Vice-President Herb Mason, Jr., accrues from royalties, dividends and sales of technical assistance. But the figures do give an indication of the spread of Reichhold influence throughout the world.)

Last year RCI's combined net sales—including those of Alkydol Laboratories (Cicero, Ill.), Varcum Chemicals (Niagara Falls, N.Y.), and Specialty Chemicals (Austin, Tex.), all of which were acquired in '59—were approximately $93.6 million. Sales of the foreign companies had by then soared to about $80 million. RCI income from its investments abroad rose from $138,000 in '49 to over $532,000 in '57. The following year showed a return of nearly $727,000, and in '59, more than $865,000.

All told, RCI's global chemical venture at last count comprised complete ownership of, or financial interest in, 24 plants in the U.S., 31 plants in 22 foreign countries, some 75 domestic and foreign sales offices and representatives, and research and development labs at many RCI and associate-company installations.

Product line, too, has changed considerably over the past 20 years. In '39 more than 90% of RCI's sales were made to the paint and varnish industry; today surface-coating resins and chemical colors account for less than 38%. The plastics industry takes about 36%, and outside sales of industrial chemicals amounts to nearly 27% of total sales (*see chart p. 85*).

Although statistics tell how much a company has grown, they do not tell how it has grown. This is particularly true in the case of Reichhold Chemicals.

The Beginnings: RCI is essentially the story of one determined man who in the mid-'20s knew where he wanted to go.

It was in '25 that a tall, red-haired, German-born chemist, 24-year-old Henry H. (for Helmuth) Reichhold, first laid the groundwork for today's international chemical complex that is epitomized in the corporation's signet—the





Lunch at RCI: Tray-pushers Henry Reichhold, Vice-President E. M. Skytta. Below: A moment of quiet reflection.



Benefactor: His dollars built Berlin Academy of Arts, helped bring cultural sparkle back to city.

bold letters "RCI" imposed on a retort containing the globe.

Henry was born in Grunewald, an upper-middle-class suburb of Berlin, on July 31, 1901. He was the youngest of seven children, four boys and three girls. Working in his father's plant and laboratory, Henry as a lad of 14 displayed an affinity for chemistry.

At the time, the Reichhold name* was well known in the surface-coating industry in Europe. Carl Reichhold, Henry's father, was associated with the Viennese firm of Beck & Koller, a retail paint and varnish company that had been selling to the coach-and-carriage trade since 1868.

He was also head of Reichhold, Fluegger and Boecking, a Viennese firm that manufactured surface coatings.

Beck & Koller (later to become Beck, Koller & Co.) expanded rapidly after it went into the manufacture of materials for surface coatings. Offices, and later factories, were set up in London, Berlin and Hamburg, and among its customers for coach varnishes were all the royal households of Europe.

The elder Reichhold's four sons joined him in the Beck & Koller business. The brilliant Otto Reichhold, Henry's mentor, supervised the Hamburg and Vienna plants. He was a pioneer in the synthetic resin industry in Europe, was killed in the *Hindenburg* disaster in '37.

Son Wilhelm managed operations in Berlin, and Hermann was active in the organization until his death in World War I.

Acting on his father's advice, young Henry Reichhold emigrated to the U.S. in '24 after schooling at the universities of Berlin and Vienna. He headed for Detroit to learn what he could about the automotive end of the paint business. It was tough going for the youngster, who spoke very little English, but he finally landed a job—at $5 a day—as an assistant in the paint laboratories of the Ford Motor Co.

Before a year had elapsed, Reichhold had been promoted to technical head of the Paint Dept. at Ford, had struck up a close friendship with Charles O'Connor (then salesman for a Midwest paint and varnish company), had taken out citizenship papers, and was already envisioning a business of his own. In short, Reichhold had decided America was for him.

"In Europe," he has said, "everything was done on a small scale. Here everything is done on a grand scale."

One of Charlie O'Connor's strongest recollections is H.R.'s desire to learn everything there was to learn about American business methods."

In the winter of '25, Henry heard from his brother Otto that Herbert Hoenel, a chemist in the family business in Vienna, had developed a heat-hardening and oil-soluble phenolic resin whose properties greatly reduced the drying time of surface coatings.

In those days automobile finishes, then called "coach-and-carriage" finishes, were made with natural gums such as damar, pontianik, kauri, congo and copal. The long drying time of these natural resins was one big stumbling block to mass production of products that had to be painted.

The new synthetic made possible finishes that would dry in a few hours, compared with days needed to dry the natural-resin finishes. It was the break Henry was looking for; he ran tests on a sample of the material and concluded that a whopping potential market for the new resin existed in the U.S., and particularly in the auto city.

Otto shipped twenty 100-lb. bags of the phenolic resin—tabbed Beckacite—to Detroit. These were stored in a

* Pronounced "Reish-hold" in the dialect of Reichhold's Berlin birthplace. The elder Reichhold's plant, however, was in what is now Austria, where the hard "ch" prevails. In the U.S. most people say "Reickhold."



Staff session vignette (front to rear): William Duval, E. A. Terray, Ralph Urich, H. L. Wampner, C. J. Windsor.

corner of the O'Connor family garage, and Henry Reichhold was in business for himself. He adopted the Beck, Koller & Co. name, hired Charlie O'Connor as his salesman and, while holding down his job at Ford, spent nights and weekends in the garage working out a way to produce the resin.

By '27, sales of Henry's imported resins were climbing. He left Ford (when he failed to get a 40¢/day raise) and decided to produce Beckacite resins for the U.S. surface-coating industry.

With a $10,000 loan from his father, which was subsequently repaid, Henry, then only 26, bought a paint and varnish factory in Ferndale, a suburb of Detroit, and fulfilled his dream—he became an American manufacturer.

Charlie O'Connor recalls the "early days":

"The factory was small," he says, "only 4,000 sq. ft. Of the two of us, Henry, of course, was the visionary, the dreamer. But it's doubtful that even he could visualize the RCI of today emerging from such humble beginnings.

"I remember that Ford soon became one of our biggest customers. Beckacite was used as a base in Ford's automobile finishes, and it actually made possible Ford's two-tone Model A. The quick-drying resin literally revolutionized the automobile industry."

Reichhold and O'Connor made a good team. Big, broad-shouldered Henry with his heavy German accent (today only a trace remains) devoted his full energies to running the plant, developing new resins, and trying to catch up with orders the hustling Irishman was bringing in from all over the country.

For O'Connor it's a far cry from the old days. A quiet-spoken, gray-thatched, septuagenarian, O'Connor today is honorary chairman of RCI's board of directors. He became president of RCI in '42, served in that capacity for 14 years, until he became chairman of the RCI board. Then, in '58, he was named honorary chairman.

O'Connor still "hits the road" as RCI's goodwill ambassador, visits customers, maintains contacts, attends and fully participates in board meetings and discussions. "But," he wistfully admits, "I no longer write orders for RCI products."

Changing Times: RCI's growth has not been haphazard. During the great depression of the '30s, Henry Reichhold, as sole owner and policy-maker of his fledgling company, had already established research laboratories to explore the potentials of phenol, phthalic anhydride, formaldehyde, fatty alcohols, and other chemical intermediates as raw materials for synthetic resins.

He was tying formulators to his full line by becoming a single source for their requirements. He kept prices low, first by improving his processes, then by expanding to produce in volume and, finally, by stepping up sales efforts to insure the volume.

Says Henry Reichhold now: "Since early in my business career, I have followed a philosophy of striving for volume sales at a modest profit. I saw no reason why Reichhold plants couldn't spring up all over."

In the mid-'30s he made his first moves toward putting up plants close to the markets he wanted to serve. A branch plant was opened in San Francisco to service West Coast customers; facilities at Detroit were expanded; a plant was established at Elizabeth, N.J., to serve customers in the East.

At that time, too, the next logical step was taken—production of chemicals needed for Reichhold resins was begun. A glycerin refinery was built at Detroit early in '38, and phthalic manufacture was soon to begin on a commercial scale. These materials were basic to production of alkyds for lacquer, enamel and other coatings.

There were two chief reasons for Reichhold's entry into manufacture of chemicals: (1) he foresaw the likelihood that shortages could hamstring his resin production; (2) he aimed to stabilize raw-material costs, level off the fluctuation of synthetic resin prices, ultimately lower these prices by building volume sales.

"Most companies," he adds, "are not satisfied with less than an 8-12% return. I'm satisfied with 2-3% and have been for 35 years. To change today would defeat our plan for growth."

The policy of volume sales and low profits has not won widespread accolades. "Cut-throat," "unscrupulous," "free-wheeling," are only a few of the less-objectionable terms used by some to describe Reichhold's marketing methods.

There is no doubt that RCI, especially prior to its public ownership, did pursue a policy of breaking into markets with prices lower than established schedules. The firm, essentially owned by one man, could afford to sacrifice short-term profits for long-term sales gains.

"I know that competitors have gotten excited when I've entered marketing areas with lower prices," understates Reichhold, "but it is simply a matter of being satisfied with a lower margin of profit, of passing along savings in costs to customers."

"No one," he adds with an ingratiating grin, "gets excited when a business like the A&P operates, say, on a 1%-return basis with the aim of doing mass-scale business. That is our aim, too: to go into really big commodity selling on the basis of lower prices."

Reichhold's detractors are quick to point out, though, that he isn't averse to jacking up prices when an item is short. Case cited: last July's phthalic increase to 23¢/lb.

Reichhold knows that the industry has long considered him a "maverick." He takes a sly pride in his "unorthodoxy," to the point of shunning the trappings usually cherished by corporation heads.

Some of his friends, presidents and chairmen of boards, he says, often chide him for having "so little dignity and

respect for the office of president." But Reichhold says seriously, "I can't abide the conventional, straight-back way of running a business."

Reichhold is no "detail" man, nor is he a memo-writer. He's not a stickler for formality in his dress (he often goes to work in mismatched slacks and coat), or in the boiled-down reports that come to him as chief executive officer, or in his headquarters surroundings.

In the comfortable, living-room decor of his office, for example, there is no desk; his "work area" is a remarkably uncluttered mahogany table sans drawers. Two telephones are relegated to a coffee table, flanked by deep armchairs, at the far side of the thickly carpeted room.

"Those phones," says Charles Mathieu, whose New York firm has handled RCI public relations for some years, "get a workout every day Henry Reichhold is in." Sitting wreathed in cigar smoke, Reichhold carries on marathon conversations with Bombay, Liverpool, Tokyo, Vienna or San Francisco offices with the casualness of a teen-ager calling his girl on the next block.

But if the RCI president is one of the telephone company's best customers, the airlines must also rate him high. He has often logged as much as 11,000 air-miles a month flying in the U.S. and abroad to learn firsthand how "things are going."

A typical instance: recently Reichhold hopped a plane for a "quick trip" to Detroit, site of the first RCI plant. What happened in the next few days explains why the pace that Reichhold sets often exhausts associates 20 years younger.

From his Detroit office Reichhold decided to fly on to Chicago. From Chicago he flew down for an unplanned visit to the RCI plant at Charlotte, N.C. Then, in quick succession, he dashed down to the New Orleans sales office, bounced over to the South San Francisco plant, grabbed a plane for Seattle (where most of the operations are being transferred to RCI's Tacoma, Wash., location) and from there went up to Port Moody, B.C. Then, still on the airways, he returned to Chicago and then to New York.

In less than a week, Reichhold had twice crossed the continent, literally circled the country. Yet, on his return, he remarked to an associate that he had had a "swell rest on the trip." And, characteristically, he was particularly pleased with himself because he had made the trip without once checking into a hotel.

Such trips here and abroad have made Reichhold one of the best-informed men in the industry, and underscore his penchant for getting information firsthand. And so does an anecdote involving a private spying mission:

Reichhold was curious about a certain petrochemical company's new phthalic anhydride facilities. Typically, he flew up to the plant, introduced himself to the gateman, and asked if he might tour the installation. He was refused admission. He then returned to the airport, chartered a helicopter, and had the pilot circle low over the barred plant until he had all the information he wanted.

Like their chief, RCI executives are heavy travelers. Travel, in fact, is one of the reasons for the relatively heavy population in upper reaches of RCI management.

At last count, RCI had 26 vice-presidents, each directly responsible for decentralized segments of the business—e.g., surface coatings, sales, marketing, purchasing, advertising, plastics, research, foreign.

"We have a lot of vice-presidents," admits Reichhold, "but this is good. An RCI representative must travel, perhaps all over the world, to discuss business with top people in other companies. He should be able to do so on an executive level."

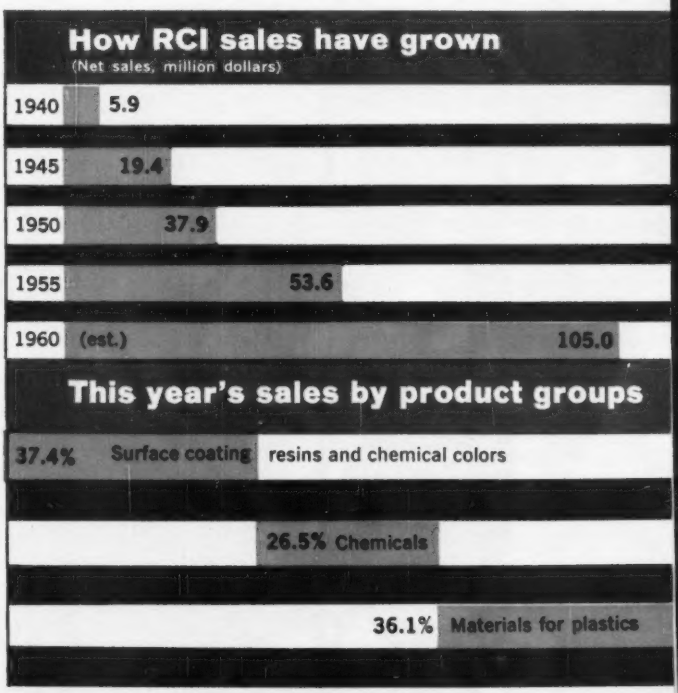
Henry Reichhold, by and large, is a paradox. He is a modest man, yet keenly publicity minded; he is genuinely kind; some say he has never been known to squander a nickel; he is considered shrewd, knowledgeable and deliberate, yet even some of his own executives, as well as people outside the corporation, say many of his most critical decisions are based on sheer instinct, on an uncanny intuition.

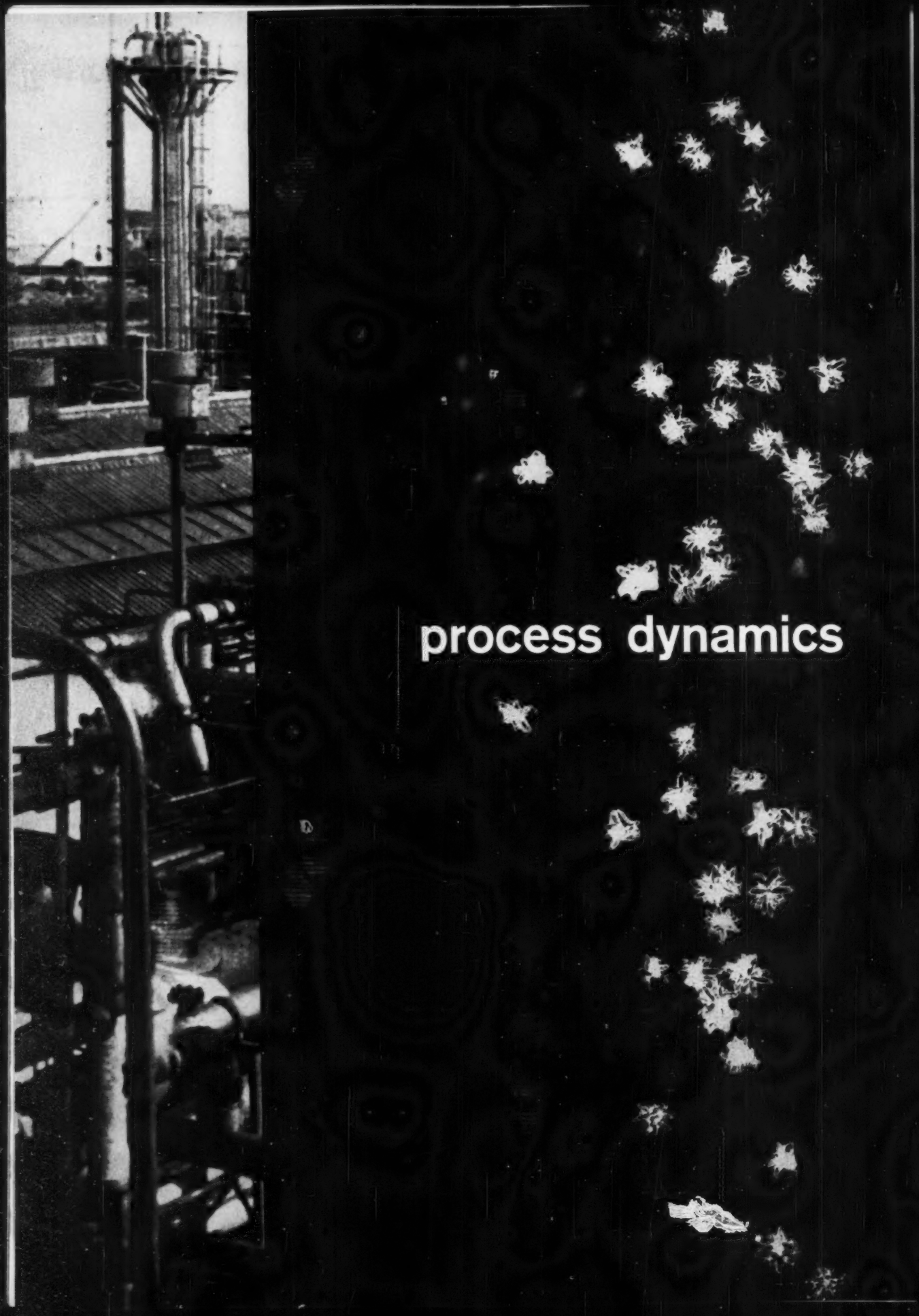
There is no doubt that intuition has frequently played a big part in Reichhold's decision-making. "And more times than not," says tall, distinguished, lawyer Albert Goetz, chairman of the RCI board of directors, "Henry's intuition has been precisely right."

One good example: the long-term deal he signed with Escambia Chemicals (in '56) for methanol that RCI needed for conversion into formaldehyde. The contract calls for annual purchase of stated quantities of Escambia methanol at fixed prices, subject to escalation, for a period of 10 years. RCI is obligated to pay for a specified minimum quantity each year whether it takes the material or not. Annual cost for such minimum quantity, reportedly, is well over $2.5 million.

"Few businessmen," says an executive of a rival firm, "would have tied their companies to such a tough take-or-pay contract." But Reichhold did. And over the past few years while others have been paying higher prices for tightening supplies, Reichhold has had (and will have for a long time to come) an assured source of low-cost methanol.

Another example of this "instinct" might have been




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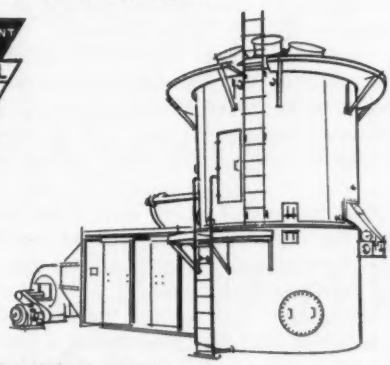
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displayed in the confusing, and confused, circumstances surrounding the plans for merging with Catalin Corp. a few years ago. After a turbulent history of merger negotiations between the two firms, Reichhold pulled out at the last moment.

Ostensibly it was because RCI (then owned 87% by Henry Reichhold) was not represented in the banking arrangements. Says Reichhold: "We had been working closely for some time with our bankers, Blyth & Co., on problems of converting RCI into a publicly held firm. But we couldn't get agreement with Catalin and the other two banking firms involved to split the financial arrangement three ways."

Although a consolidation seemed to indicate considerable benefits for both outfits (*CW, April 14, '56, p. 17; Sept. 15, '56, p. 13*), developments show that Catalin would have gained much more, particularly since the latter's financial condition has declined while RCI's has strengthened.

Catalin's President Harry Krehbiel, a close friend and business foe of Henry Reichhold since the mid-'30s, implies that there may have been a more personal reason for the scuttling of negotiations.

"It would have been tough for someone of Henry Reichhold's caliber and temperament," reflects Krehbiel, "to swallow having others—in Catalin or in any other company—share authority for running a merged company."

There is much that bolsters such a conclusion. Reichhold, reportedly, has talked long and seriously with many firms about merging.* Among them: Hercules Powder, Dow, Standard Oil Co. of California.

Most of the merger discussions over the past few years were fruitless simply because, the trade talk goes, the firms seeking to absorb RCI would have slapped restrictions on Reichhold which he could never have tolerated.

"The door is probably still open for a consolidation, merger or joining of forces," says a source close to the RCI president, "but no deal would be consummated unless H.R. were allowed to retain complete authority to run the operation as RCI is run now." And this means informally, independently, differently.

Being different has always been a characteristic of both the man and the corporation. A story illustrates the point: During World War II the Navy sent a Harvard Business School graduate to RCI to "study American business methods" for six months. At the end of his tour of duty the trainee summed up his experience: "Everything I have learned here at Reichhold Chemicals deviates from the accepted business procedures I was taught at Harvard. RCI operates like a small grocery store—but on a big scale."

The description is one RCI people like. It typifies the informality of the organization, as well as the basic formula evolved by Reichhold himself years ago that each customer must be treated individually.

A quarter of a century ago, through the pages of the corporation's well-read and pioneering house organ "By Gum!", Reichhold made the standing offer to consumers of RCI products "to send to *your* plant, to assist in the solution of formulative problems, *any* member of our technical staff, and with sufficient time at his disposal to remain on the job until it is completed, whether it takes an hour, a day or a week."

This philosophy led to the establishment of RCI's chain of technical and sales service laboratories that Executive Vice-President and Director Dr. Stefan Baum credits as "one of the biggest contributors to the success of the business."

But much of the remarkable success of RCI must also be attributed to people like Baum, one of the team of early Reichhold associates who have become key men in the organization.

Most of the directors and executive officers of the corporation, for example, have been with Reichhold more than 25 years. These executives include Charlie O'Connor, Bert Goetz, Steve Baum, Herb Mason, Ralph Urich, Fred Grosius, M. W. Reese and P. J. Ryan.

Baum, particularly, has been close to Reichhold. They were schoolboy chums in Germany, and Reichhold was instrumental in getting the Baum family out of the country before the Hitler purges in the '30s.

Baum, a serious-miened, stolid, precise-minded man, is given to minute analyses of management problems. His deliberate approach often clashes with Reichhold's cheerfully optimistic, and opportunistic, plans to expand the corporation's activities.

"About 90% of the friction, if you can call it that, in our meetings," says one board member, "stems from H.R.'s insistence on making snap decisions involving corporate commitments."

"Sometimes H.R. doesn't like to face the cold facts," adds Baum, "like how much money is available for the schemes he wants to push through."

A weighty concern for "available money," for "budget," pervades all top-management discussions. It's a carryover from the prepublic days when RCI, as a one-man operation, had to scratch hard for expansion funds—and every penny counted.

The big changeover from Reichhold's seat-of-the-pants handling of finances came during the Catalin-RCI merger discussions, when RCI's accounting system was completely revamped. Catalin President Krehbiel had a thorough check made of all Reichhold operations. "Frankly," he says, "we expected to find all sorts of skeletons in the financial closet, but this was not so. RCI turned out to be pretty clean."

RCI's financial department—staffed today by 66 people and equipped with electronic data-processing systems—is run by young (41) Vice-President Donald Tuson, who has been with the firm about six years. He is as hardheaded about spending RCI money as any of his comembers of the company's powerful finance committee.

Good Show: Sitting in on an RCI board of directors meeting gives a good insight into the relationship between Reichhold and his senior officers, and the global nature of the business.

Informality is a keyword. What little resemblance there is to parliamentary procedure comes from the calm im-

* Current speculation concerning an RCI marriage—though discounted by top officials of the corporation—center on Signal Oil. A petrochemical source (Signal will be producing petroleum-derived benzene by year's-end) would give RCI a new and divergent source of raw material for its resins operations.

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Financial report: Finance Vice-President D. B. Tuson; Research Director H. L. Wampner; Urich; Goetz.

partiality of Chairman Bert Goetz, and the rapid jotting of minutes by his brother Jack, who is secretary of the corporation and who was recently made a director and vice-chairman of the board.

H.R.'s participation is no more or less than that of the other officers, although he still holds about 1.5 million shares of the corporation stock. He frequently breaks into a member's discourse with a gentle needling, a probing question, or a humorous observation.

For example, in discussing the construction of a proposed new research lab, Reichhold archly suggested that Alsynite panels might be used "but only if the architect would give us a 10-year guarantee." (The panels are a Reichhold product.)

Although Reichhold can still exert considerable influence on board decisions, he is gradually coming around to the realization that the organization is now too big to be run as it was when he was sole owner and policymaker. More often than not, he will conclude a lengthy opinion (e.g., on allocating money for a new venture) with the assertion, "I think we should do this, but it is up to the board."

Not always does the board buy his opinion. It is not a rubber-stamp group by a long shot. On occasion, the table is pounded, tempers flare, and someone "takes a walk." Reichhold, invariably for quick action, must often bow to the board's decision that the matter be tabled.

Although control of the global Reichhold complex centers primarily in the hands of Reichhold and his senior executives, the whole operation depends heavily on RCI's middle-management echelon.

"Staff" meetings, conducted by Sales Vice-President Urich, are held at White Plains about once a month. Primarily sales functions, these meetings are attended by a variegated crew—on the RCI theory that sales are affected by all activities of the company. Product sales managers, department vice-presidents, field salesmen and visiting plant personnel pack around the long table, perch on chair arms in the spacious board room meeting place.

The staff meeting is a forum at which salesmen air their problems—hopes are propounded, unfavorable aspects of the business are hauled out and dissected, markets are analyzed, plans for boosting RCI sales are mapped.

Frequently Reichhold sits in, figuratively beams with pride when one of his "young men" spells out ways in which his operation can save the company money, step up sales, or open up new markets.

Foreign Steps: The present trend of U.S. companies to establish manufacturing units in other countries, as a means of combating tariff barriers and growing imports and as a way to increase corporate income, is focusing attention on RCI's methods. The formula is basically simple, has proved highly effective: Reichhold never moves into a country as a stranger. Reichhold says, "We operate on an associate partnership basis, which implies friendship and mutual respect."

Here's how RCI generally works it: The Reichhold product eventually to be made in the foreign country is first imported and sold there (sometimes for years) by trusted RCI "agents." Thus the market is created and built up. Once demand is there, Reichhold seeks out foreign partners who are financially responsible and successful, preferably in a related branch of the industry.

In establishing such affiliations, the parent company in the U.S. acts as a financial partner with private capital in each country concerned. Reichhold contributes capital, technical know-how, and the results of continuous research carried on at U.S. Reichhold installations.

Stock in the affiliate is divided between RCI and local investors, with majority interest usually going to the latter. Regardless of local restrictions on majority ownership, Reichhold voluntarily prefers a minority interest. Reasoning: by taking a minority share, RCI is viewed, not as an outsider bent on exploitation but as a friend interested in the economic development of the host country's resources. RCI often plows back its share of the profits to strengthen or expand the joint enterprise.

It is said that Reichhold was operating his own "Point Four" program long before Washington had the idea.

The RCI venture in Japan is probably a good example. In line with official U.S. postwar policy of contributing to the economic rehabilitation of war-ravaged countries, RCI moved in with its own capital to form a Japanese affiliate in the mid-'50s. Object: to manufacture a complete line of resins for Japan's paint, printing ink, paper, plywood, plastics and textile industries.

The project has been eminently successful. Baum, after a trip to Japan earlier this year, reported that the Reichhold-Japan company will soon issue an additional 200,000 shares to the public in Japan at 1,000 yen/share, and expectations are that this will increase in value to 2,000 yen in one or two years. (Current issue price is double that originally paid.) About 17,000 shares, incidentally, will be allocated to RCI executives and other employees.

A technical-aid contract with the Japanese runs until the end of '62, but is renewable for an additional 10 years. Reichhold anticipates no difficulty in getting Japanese government approval for the extension, simply because local people own majority interest, and the Japanese operators have close connections with the government.

While theoretically RCI does not control the foreign companies in which it owns only minority stock (ranging downward from 45% in Japan), there is no doubt that final—and welcome—direction comes from RCI headquarters in White Plains, N.Y.

Main ties that give the corporation a strong voice in such operations include: (1) royalties agreements, (2) continuous imparting of RCI know-how, (3) contract conditions indicating that certain actions regarding operation of the joint company may not be taken without prior RCI approval, (4) frequent exchange trips among sales, research and production management.

Practical Philanthropy: While Henry Reichhold appears to get his biggest satisfaction out of his business—he often spends 12-15 hours a day "at the office"—he is also intensely interested in the arts.

Reichhold is reluctant to talk about his philanthropies, but others point out that he set up the Henry Reichhold Foundation with 250,000 shares of RCI stock in trust for educational scholarships and that he is a generous contributor to many other worthwhile causes.

One of his philanthropies is the Berlin Academy of Arts, dedicated this year in the city of Reichhold's birth. The "dream house of the arts," construction of which was underwritten by Henry Reichhold, includes exhibition buildings, concert halls, experimental theater, and several interior courts for "small concerts or intimate conversations and reflection."

It was built of Dutch bricks, marble, glass and plastics, was conceived during a casual meeting between Reichhold and brilliant young Berlin architect Werner Düttmann in Hamburg in '54. As Düttmann and Reichhold commiserated over Berlin's loss of cultural sparkle, the architect proposed his plan to "bring life and music back to the city." Reichhold enthusiastically agreed.

The long conversation at the Hamburg airport that day ended with Reichhold's offer of "one million for the academy." "Dollars or marks?" cautiosuly asked Düttmann. Reichhold (reputedly worth $30-40 million) replied simply, "Marks, I don't have."

His million-dollar pledge, worth about 4.2 million marks, was eventually to tally more than 7 million marks.

'Not Yet': Recently there has been talk that Reichhold, whose once-red hair is dark and streaked with gray, is contemplating retirement. This speculation heightened last year when he plunked down more than $1.5 million for the luxurious 72-room Bluebeard's Castle Hotel in the Virgin Islands. The deal, which also included a beach club and the purchase of an additional 200 acres of property, gives Reichhold a chance to combine business with fun. He is an avid swimmer, still plays a powerful game of tennis, loves the outdoors.

But on the 200-acre tract, Reichhold plans to build several-dozen tourist cottages using Alsynite glass-fiber-reinforced polyester plastics predominantly. The components will be prefabricated for assembly on the site, and the project, in essence, will become a testing area for low-cost housing that can be built in underprivileged countries, where steel, concrete and other conventional building materials are unavailable.

As far as retirement is concerned, Reichhold smiles and says, "Not yet." He fully believes that "RCI is going places, that the chemical industry as we know it today is only in the laboratory stage of development, that the future will exceed our most optimistic predictions."

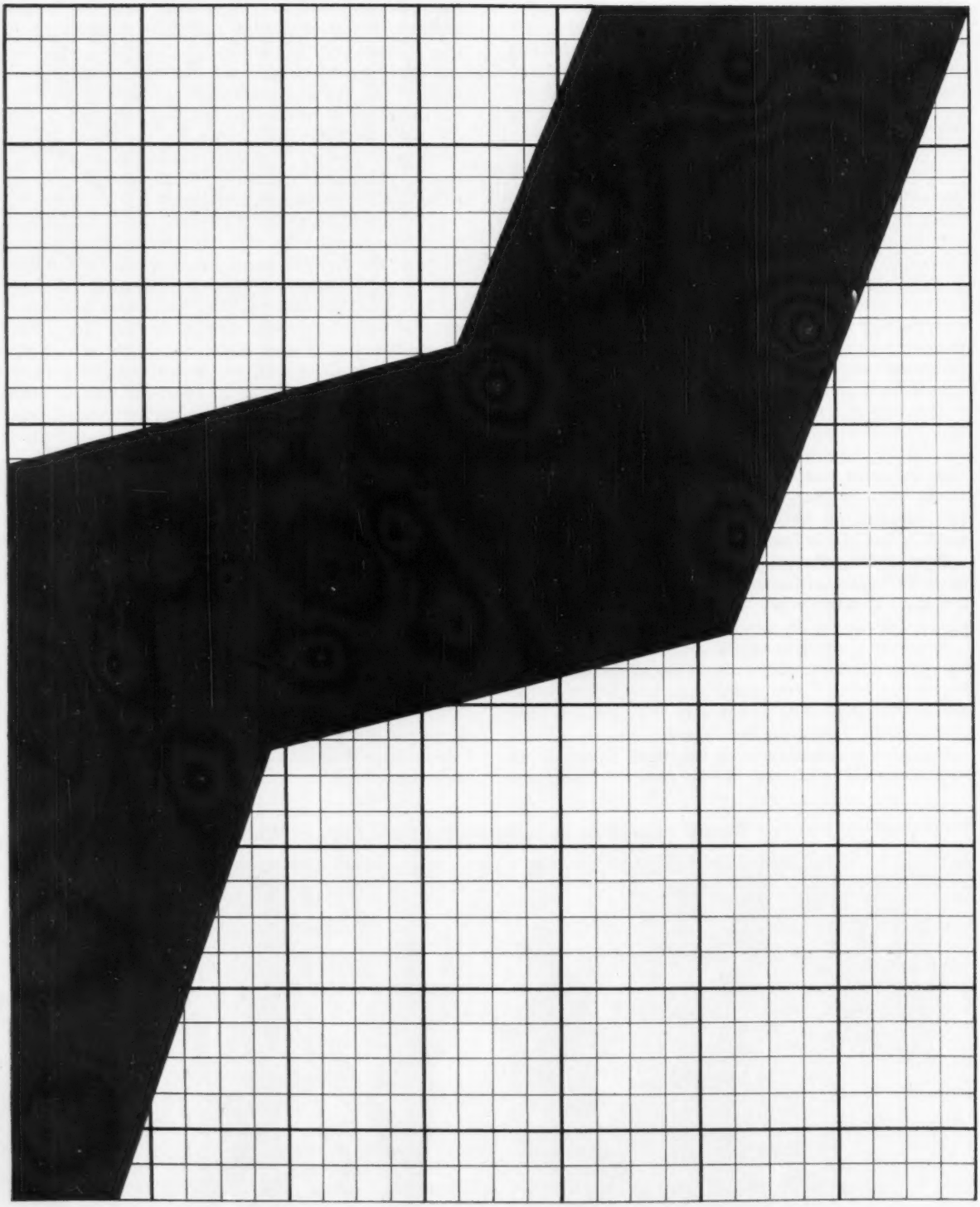
For Henry Reichhold, to step down now would indeed be difficult.

Headquarters interior: Casual discussion in sumptuous surroundings of White Plains, N. Y., building.



Ameripol Micro-Black sales climb

Here's why . . .



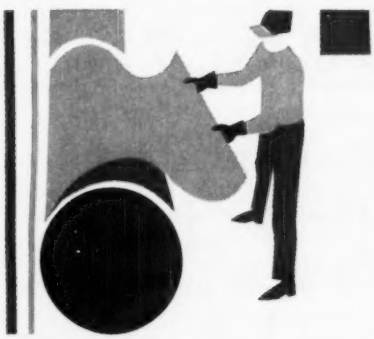
more than 1400% in just 18 months

Users report 21 ways to improve rubber products, save time and money with Ameripol Micro-Black masterbatch

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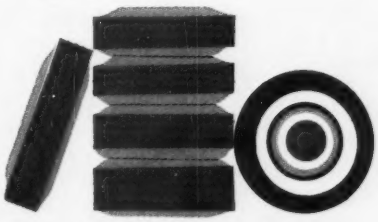
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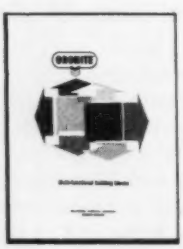
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6053

Recruiting Trend: Fewer Bodies, More Quality

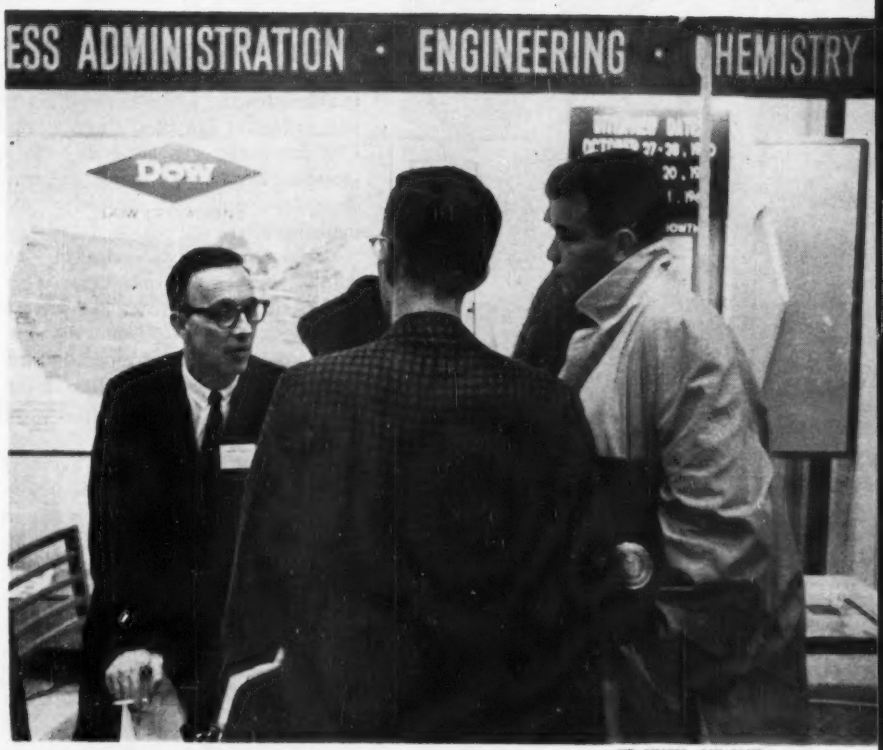
The chemical industry generally will be looking for fewer new technical-degree holders next year, but competition for top specialists will be tougher than ever. This indication of what recruiters will seek and find this year came out of Michigan State University's recent annual "Career Carnival" and a Chemical Week survey of CPI firms now planning new manpower requirements for next year.

CPI companies, including such major leaguers as Alcoa, Diamond Alkali, Dow, Dow Corning, Du Pont, Reynolds, Standard Oil (Ind.) and Upjohn, were among the 70 companies represented at the MSU show, a 12-year-old institution started by the students themselves. Although there's little actual recruiting done at the carnival, recruiters may lay the groundwork there for scheduled visits later in the fall.

In addition, the show is a harbinger of recruiting in the Midwest. The views of CPI recruiters at the show and the estimates of other companies indicate a lively year ahead for acquiring technical manpower.

Requirements Down: After an "above average" '59-'60 season, most companies anticipate no increase — compared with last year—in the number of new technical graduates they will hire at the end of the academic year, and many expect to be hiring fewer. For example, one of the nation's biggest hirers, Du Pont, reports its quotas are down a third—600 or 700 this year—from last year's high of 900. The only exceptions to this are companies currently undergoing expansion in research and production and one large company which frankly admits it hired well below its quota last year.

It's too early yet for most companies to have definite requirements on paper. Some companies are waiting until third- and even fourth-quarter statements are in or until after election day before next year's plans are confirmed. The colleges, too, have noticed a trend toward hesitancy in recruiting. One Eastern university, which turns out a large share of potential CPI manpower, says that a number of companies have postponed recruiting



CW PHOTOS—ROY BASH

Students at MSU 'Career Carnival' learn about area industry and get specific company information before recruiting season starts.





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Mechanical "	535
Civil "	525
Agricultural "	515
Accountants	455
Marketing (majors)	450
Personnel (majors)	437
Liberal Arts	412

Allow ±5% of these average salaries for regional differences.

trips for this year and some have even canceled.

Quality Competition: Although numbers may be down somewhat, competition promises to be much keener, especially for Ph.D.s in polymer and physical chemistry and engineers with graduate degrees. A man with a B.S. in chemistry and a Master's in business administration can choose almost any CPI company; a pharmacist with a graduate degree can select his own drug firm. Solid-state physicists and mathematicians are scarce.

Competition for nontechnical men will be steeper not only from other CPI firms but also from the defense industries. Whereas chemical companies spend an average $2,000 on recruiting for each graduate hired (ranging from a reported low of $1,200 to a high of $5,000), the electronics industry, for example, figures it costs in the neighborhood of $7,000 to recruit each new technical man. In competing with these industries, CPI recruiters find great differences in techniques from the "hard-sell defense boys."

Low, Inside Pitch: Techniques that CPI recruiters use have changed very little over the past few years, according to companies contacted. Still, a number report using a "harder sell"—greater college coverage, more interviews, longer time spent with each candidate, increased advertising on campuses, more contact with faculty and placement people, and more informative, attractive brochures.

Unlike some other industries, the CPI generally hire men for only specific jobs, realizing that "hiring a good man without a definite job for him—putting him on the shelf—is a sure way to lose him in a few years." An individual approach is the key to hiring in the industry.

Although starting salaries are high (*see chart, left*), most recruiters believe that money is not the dominant factor in job selection, particularly among Ph.Ds. The latter look most closely at the job itself, particularly when it's in the research area, and at the professional climate in which they will work. The B.S. graduates are more interested in further training and advancement possibilities than in salary.

Generally, recruiters are more interested in academic standing among research men and advanced degree holders. Personality and extracurricular activities of B.S. students, who generally go into production, product development or sales, receive closer scrutiny.

Several companies report that sales positions are still hard to fill and find three causes for this: (1) students' lack of understanding of sales; (2) stigma placed on sales in academic circles; and (3) national preoccupation with the country's academic stature, which tends to push students toward research and development.

Recruiter Evaluation: Speaking of the current crops of graduates, most recruiters do not find students any better prepared for jobs in industry than in previous years. However, they do concede that most universities attempt to give the student a greater industrial, less academic, approach to the CPI disciplines.

They find few well-equipped Bachelors for employment, since the better B.S. students usually go on to graduate school. Also, most recruiters decry a lack in basic communication skills at all educational levels.

Recruiters favor the direct approach through colleges over recruiting by other methods such as association placement groups, agencies and advertising. Even with advanced recruiting techniques, about 20% of next year's newly hired graduates will be the "old-fashion type who like to get their own jobs," who won't fall under the spell of the college recruiter.

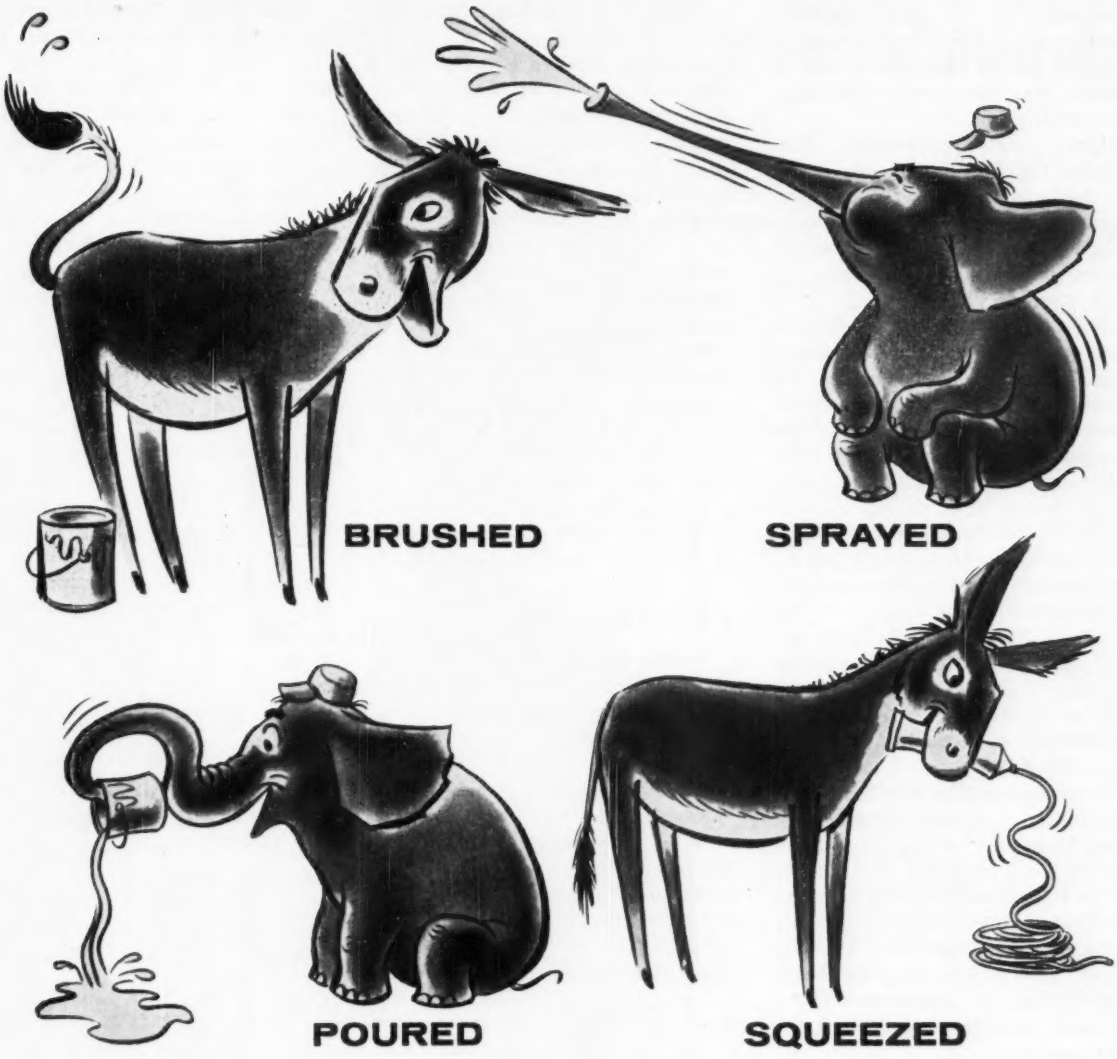
Two Choose Presidents

New presidents were appointed last week at Food Machinery and Chemical Corp. and at United States Rubber Co. They are, respectively, James M. Hait and George R. Vila, both long-time servants of their companies.

At FMC, Hait—who has been executive vice-president of the Ordnance Division—is known as a highly creative engineer who was chiefly responsible for the development of the "Water Buffalo" amphibian used in World War II. One of the founders of FMC along with board chairman Paul Davies, Hait has been a major force in spurring the company from a $10-million prewar enterprise to the $342-million business of today.

A warm, friendly man, according to colleagues, who loves hunting and fishing, 54-year-old Hait owns a "several hundred"-acre ranch near

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San Jose, Calif. (the company's headquarters city), where he raises cattle. His 19-year-old son, Paul, was a medley relay breast-stroke medalist in the '60 Olympics.

Until Hait's appointment, Paul Davies, board chairman, had served as chief executive officer since retirement of Ernest Hart in midyear. Hait's background in development is expected to continue influencing FMC's growth policy.

Vila: At U. S. Rubber, 51-year-old George Vila was named president and chief operating officer. For the last three years he's been group executive vice-president in charge of the company's textile, international, plantation and Naugatuck Chemical divisions, among other things. He succeeds John McGovern, who is retiring from operations (although he will remain on the board and the executive committee).

Vila, a Philadelphian by birth, enjoys country life. He and his wife are enthusiastic antique collectors, live on a farm in Woodbury, Conn., where they keep a small herd of sheep and some horses.

A graduate of Wesleyan University, and holder of an engineering degree from Massachusetts Institute of Technology, Vila started with U. S. Rubber in '36 as a rubber chemicals salesman in the Naugatuck Division. He rose steadily through that division in research and development, and management, until his appointment in '57 as group executive vice-president for the company.

Vila will be responsible for manufacturing, sales, research and other operations of the company. H. E. Humphreys, Jr., who is board chairman and chief executive officer, will continue responsibility for financial, legal and other corporate matters.

Climate Critic Speaks

One of the chemical process industries' most outspoken critics of communities' attitudes toward industry and business last week condemned his own headquarters area as a prospect for new investment. Clinton Robinson, president of Carborundum Co., told listeners at an industrial development workshop luncheon in Buffalo, N.Y., that he probably would not select the Niagara Frontier, or even New York state, as the site for a large new plant unless there is a "substantial change" in the industrial climate.

Robinson attacked the high taxes and labor costs on the Niagara Frontier, which, he said, discourage construction of new plants in the area. It was Carborundum that a few years ago wrested agreement from the Oil, Chemical & Atomic Workers Union for a "satisfactory" labor contract that would permit it to build a new plant near Niagara Falls instead of in Ohio, as had been planned.

Robinson said the company was hopeful early last year that an industrial-climate survey it made would help the Niagara Falls citizenry to realize their area's shortcomings and that a "real effort would be made to do something about them. Unfortunately there seems to have been little progress at either the state or local level."

LABOR

Atomic Dispute: Wage settlements of 9¢/hour have been made at two of three major work units in the government's atomic installations at Oak Ridge, Tenn., and Paducah, Ky. At Paducah, Oil, Chemical & Atomic Workers Local 9-288 and management of Union Carbide Nuclear Co., which operates both plants, reached settlement without strike; at Oak Ridge the Atomic Trades and Labor Council also settled amicably. But in the gaseous diffusion area at Oak Ridge the OCAW local is on strike. Although all negotiations come under a wage-reopening clause, the local reportedly is trying to inject discussions about a leave of absence problem of an employee. Supervision is operating essential portions of the struck area at full capacity.

•

Smelting Extension: International Union of Mine, Mill and Smelter Workers and the American Smelting and Refining Co. have agreed on a one-year extension of present two-year contracts covering 6,000 workers at Asarco properties throughout the U. S. The extension will result in wage increases of 7 to 9¢/hour, expanded pension benefits and improved vacations. The change in pension benefits, according to the union, establishes the first $100/month pension benefits plan, exclusive of social security, in the nonferrous metals industry.

Allied Strike: About 750 employees at Allied Chemical's Plastics and Coal Chemicals Division plant at Bridesburg, Pa., represented by Local 12-667, Oil, Chemical & Atomic Workers, have gone on strike following expiration of a one-year contract. The union says it's ready to accept the company's 4% — about 11¢/-hour—wage increase offer, but is balking over the company's efforts to contract out construction work.

•

Phosphate Wildcat: A month-long wildcat strike by International Chemical Workers Union against International Minerals & Chemical Corp. at the company's phosphate plant in Florida has been ended. The National Labor Relations Board has handed down a ruling that dismisses "for lack of evidence" the strikers' charges of unfair labor practices. The strike stemmed from allegations by employees that the plant is operated under unsanitary conditions.

KEY CHANGES

William S. Vaughn to board of directors, **W. Rowell Chase** to executive vice-president, Procter & Gamble (Cincinnati).

Edward E. Aldrich to vice-president, Rexall Drug Co., subsidiary, Rexall Drug & Chemical Co. (Los Angeles).

Harry J. Long to vice-president, The Wm. S. Merrell Co. (Cincinnati), subsidiary of Vick Chemical Co.

Arthur F. Earle to vice-president, secretary, Aluminium Ltd. Sales, Inc., U.S. subsidiary, Aluminium, Ltd. (New York).

Robert C. Schmidt to assistant to the president, Copolymer Rubber and Chemical Corp. (Baton Rouge, La.).

M. E. Pickett, Jr., to vice-president and general manager of the carbon black and pigment division, Columbian Carbon (Canada), Ltd., subsidiary of Columbian Carbon Co. (New York).

KUDOS

To **Hans Stauffer,** president, Stauffer Chemical Co., the Chemical Industry Medal of the Society of Chemical Industry.



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It's the differential that makes the difference. Ethanolamines cost *more* per pound in drums—*less* in compartment tank cars or trucks. Most manufacturers can take advantage of the money-saving bulk price by ordering all their organic chemical needs in combination shipments from CARBIDE.

A 4,000-gallon-capacity tank car can be made up of two chemicals in compartments, with a savings of 4 cents on every pound of the average chemical. The total average savings is $1,280—$1,280 that can be added to profits or applied to greater production. Three-compartmented tank cars hold 6,000 gallons, and the greater capacity means bigger savings.

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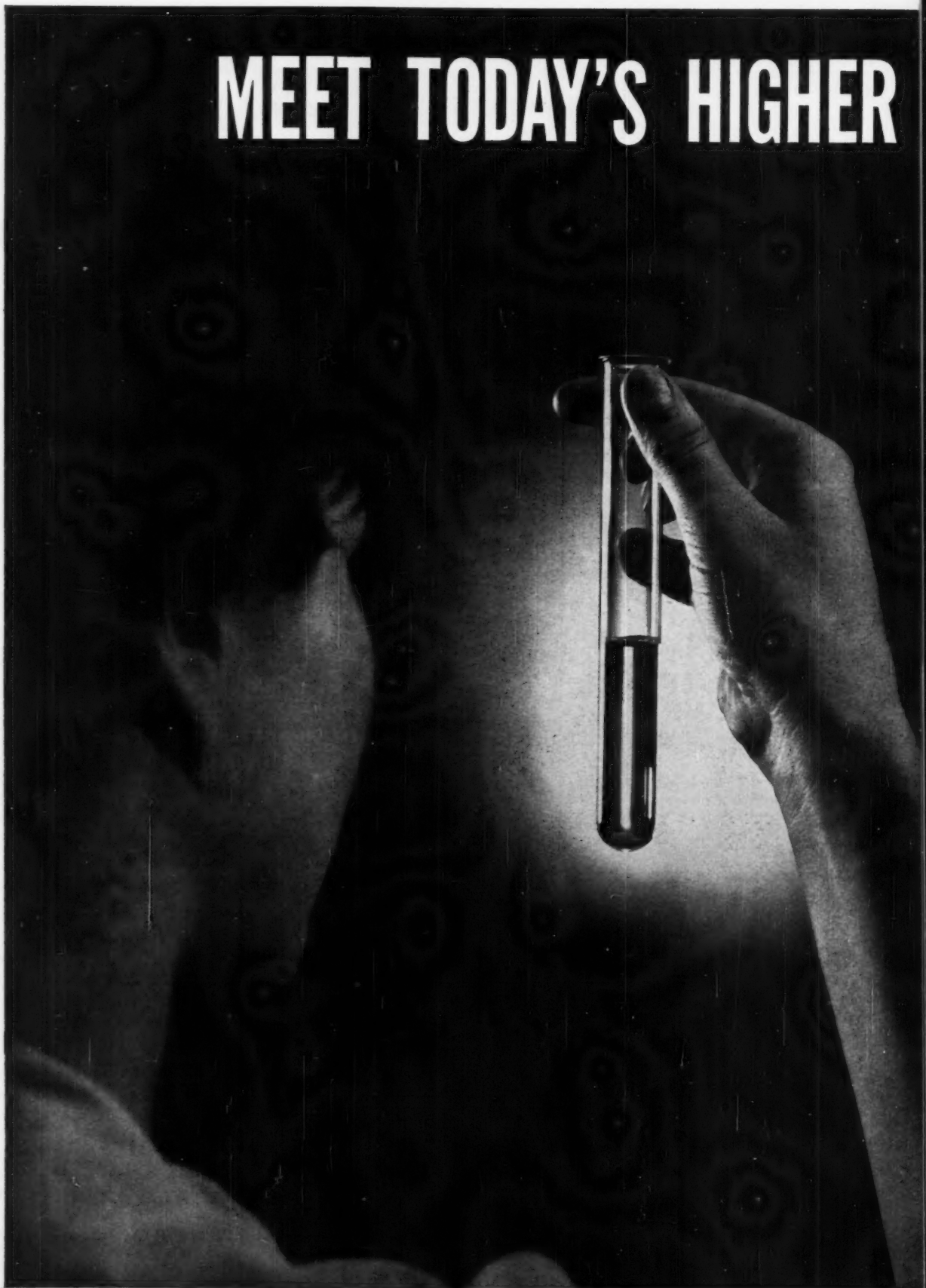
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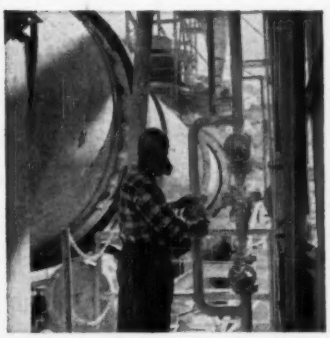
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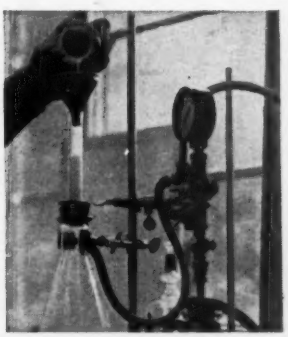
Your Dicalite man will be glad to advise with you on any filtration problem and help you determine if a customized filteraid will advance your processing.



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If the proof is in the testing, here's a young fellow who's obviously had a point proven to him. Chances are that Hercules® CMC—Cellulose Gum—has been used in the formulation because Cellulose Gum is becoming increasingly popular as a stabilizer for both pie fillings and meringues.

In lemon pie fillings, such as the delectable one in the picture, Cellulose Gum is providing greater clarity, elimination of cracking and syneresis, and a more pleasing, less short texture.

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VC60-2

Market Newsletter

CHEMICAL WEEK
October 29, 1960

Add another entry in the packaged antifreeze field. This week Antara Chemicals (Division of General Aniline & Film) unveiled its own permanent-type antifreeze under the trademark Ramp. Initial distribution, directed by Frank Bahl, will be through industrial users, some larger distributors who deal with auto parts jobbers and trucking companies, plus a number of independent service stations.

Ramp will be marketed in 1-qt. and 1-gal. cans and in 55-gal. drums. Antirust, antifoam and anticorrosion agents are included in the final formulation.

Although the company got its plans moving too late for the private-label business (contracts are usually let from May through July), this segment of the market is definitely being aimed at for next year's sales push. Plans call for helping the customer set up a private-label package, then selling him the canned material.

Antara makes ethylene oxide at Linden, N. J., where it also produces ethylene glycol. During the last three years the company has been selling blended and dyed antifreeze in bulk. It also sells the unformulated ethylene glycol.

•

Shutdown of three refinery units was reported at Sinclair Refining's Corpus Christi, Tex., refinery this week. The Houdry cracking unit and the hydrofluoric acid alkylation and Visbreaker units were all taken out of operation. Reason, Sinclair says: the refinery is old and starting to prove uneconomical to operate, and modernization would be too costly. Refinery throughout will remain at 30,000 bbls./day, but production of specialty petroleum solvents and aviation gas will be stopped.

•

Polyester fiber prices are moving at split levels this week as a result of last week's price cut by Beaunit Mills on its Vycron fibers. Quotes for the 1.5- and 3-denier fibers were slashed 26¢ and 36¢/lb., respectively, to current tabs of $1/lb. Other producers—Du Pont, Tennessee Eastman, Fiber Industries Inc.—are not going along with the Beaunit move, however, will continue to move goods at the old prices.

•

Two new units are onstream this week. Stauffer's new plant at Weston, Mich., is producing ultrapure titanium trichloride commercially. The new grade of material, designated as AA, is highly reactive, which is expected to contribute to its usefulness as a catalyst in polypropylene production.

Thompson Chemical's Pawtucket, R. I., plant is now making lauroyl peroxide. The material is used in the plastic industries as a catalyst and activator, as well as a chemical intermediate and drying agent for oils and waxes.

Manufacturing and marketing of catalytic mufflers by Universal Oil Products (Des Plaines, Ill.) will be handled by a newly formed subsidiary, Universal Oxidation Processes, Inc. (Los Angeles). The company is now waiting for certification of its muffler, called Purzaust, by the California State Motor Vehicle Pollution Control Board, according to UOP President M. P. Venema.

Purzaust is one of a number of devices under study by the board. As soon as two devices have been certified, each auto owner in the state will be required to equip his car with one or the other (*CW, Oct. 22, p. 27*).

•

Two refrigerated anhydrous ammonia barges for Phillips Petroleum Co. will be built by Avondale Shipyards, Inc. They will be the largest tank carriers ever constructed for this type of service. Each will have two tanks, 16x241 ft., and will carry, at atmospheric pressure, 1,700 tons of anhydrous ammonia refrigerated to minus 28 F. Avondale (New Orleans) tells *CW* that the refrigeration principle to be used is also adaptable to transportation of propane and LPG by barge.

•

A new European source of ilmenite concentrates for titanium dioxide pigments is National Lead's subsidiary in Hauge i Dalane, Norway. The new Tellnes mine and mill of Titania A/S will be able to turn out 300,000 tons/year of ilmenite concentrate. Ore reserves are estimated at 100 million tons of recoverable ilmenite concentrate.

•

Consumption of oxygen in the British steel industry will rise to 5,000 tons/day (1.8 million tons/year) by mid-'60, according to the British Iron and Steel Federation. Advent of relatively cheap oxygen in bulk is causing a wave of change throughout the industry. Currently, eight high-purity tonnage oxygen plants are in operation (daily capacity: 1,125 tons), and negotiations for further units are now being conducted.

One outstanding example of the use of this chemical in the U.K. is in the Ajax Furnaces of U.S. Steel's Appleby-Frodingham works, which now uses up to 1,500 cu.ft. of oxygen/ton of steel. Result: production has increased from 63% to 103% over previous nonoxygen rates, fuel consumption has been reduced to 20% of the former level.

SELECTED PRICE CHANGES—WEEK ENDING OCTOBER 24, 1960

	Change	New Price
UP		
Cocoa butter, bgs.	$0.005	$0.625
Coconut oil, crude, tanks, Pac. coast	0.00125	0.125
Cottonseed oil, crude, tanks, Southeast	0.00125	0.9625
Iodine, crude, kgs.	0.15	1.10
DOWN		
Camphor, synthetic, U.S.P.	$0.02	$0.58

All prices per pound unless quantity is quoted.



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PROPYLENE PURIFICATION	Engelhard catalysts remove propadiene as well as methyl-acetylene
COKE OVEN GAS	Acetylene removal from streams containing up to 150 ppm. carbonyl sulfide. Ethylene content preserved for synthesis purposes
METHANOL SYNTHESIS GAS	Acetylene removed to 1 ppm. Ethylene content of stream increases

For full details, write for Brochure E-1

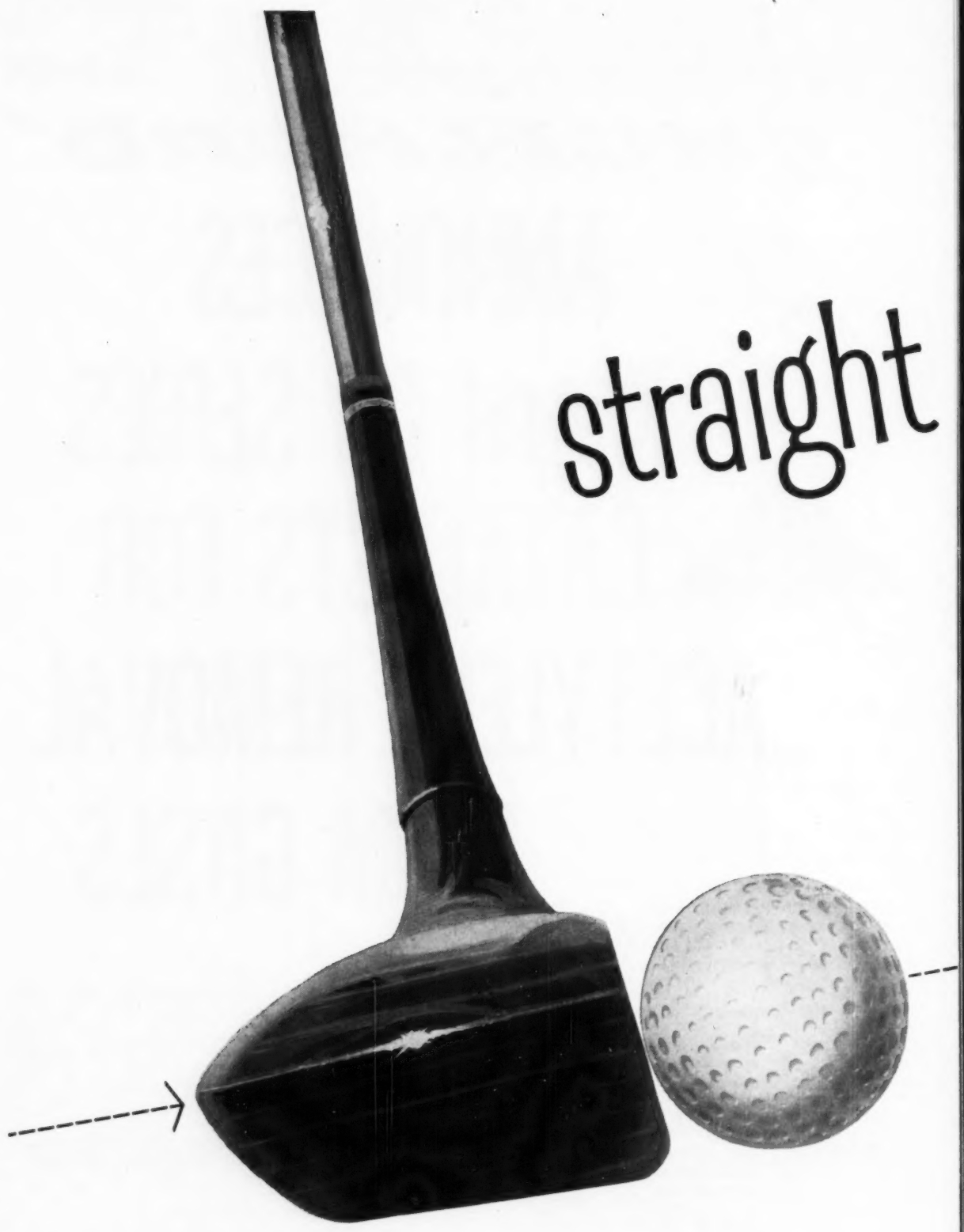
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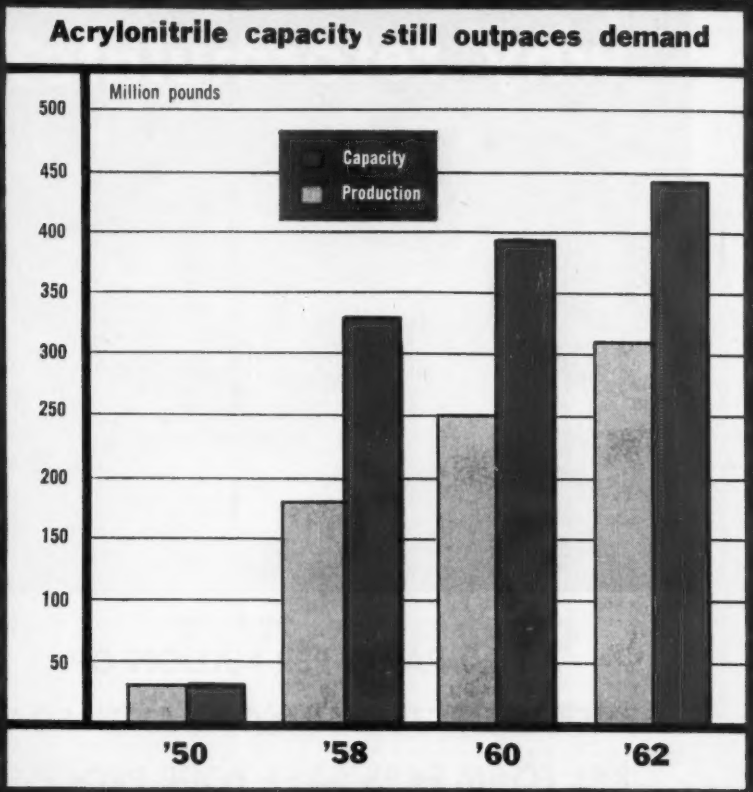
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Anticipating time . . . boy or girl? One thing's for sure. The child's future will be more comfortable and healthy, thanks to your practical applications for Jefferson Ethanolamines. Surrounding this soon-to-be mother are cosmetics and toilet goods, wool blankets and baby clothing, rubber pants and gloves, and behind scenes . . . sweetened natural gas to cook food and dry clothes.

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JEFFERSON CHEMICALS



Acrylic fibers' fast-paced growth during the past decade has spurred demand for new acrylonitrile capacity (chart right). *Now, however, with one important fiber producer going basic, and another on the verge of doing so, acrylonitrile marketers are finding themselves with a growing capacity surplus.*

Acrylo Problem: Too Much, Too Soon

U.S. acrylonitrile capacity got another boost this month with the start-up of Du Pont's first acrylonitrile unit at Memphis, Tenn. And Du Pont has just started construction of a second acrylo plant at Beaumont, which should be in operation in late '61 or early '62. These two developments are precursors of acrylonitrile overcapacity that seems certain to cause some serious problems during the next three to five years.

The Memphis plant will utilize the acetylene-hydrogen cyanide route researched by Du Pont's Electrochemicals Dept. Initial capacity will be about 50 million lbs./year. For the Beaumont unit the company's Explosives Dept. has come up with another route, using ammonia-propylene, and output potential will be also about 50 million lbs./year. It's probable, moreover, that both units have been designed so that they can each be easily expanded — if needed — by another 25-30 million lbs./year.

But this 100 million lbs./year of new capacity may be hard to absorb. Demand is currently 240-250 million lbs./year and likely will top 300 million lbs. by '62, whereas total capacity will be about 445-500 million lbs./year (*see table, p. 110*). Thus the industry will be faced with at least 150 million lbs./year of overcapacity.

Fibers No Answer: Rapid growth of acrylic fibers during the past decade has been the big reason behind the runaway acrylonitrile buildup. About two-thirds of the acrylonitrile produced winds up in this outlet. And until last month, its biggest user for fibers, Du Pont, was a ready customer for merchant acrylonitrile. (Du Pont turns out about 66% of the acrylic fibers produced in the U.S.)

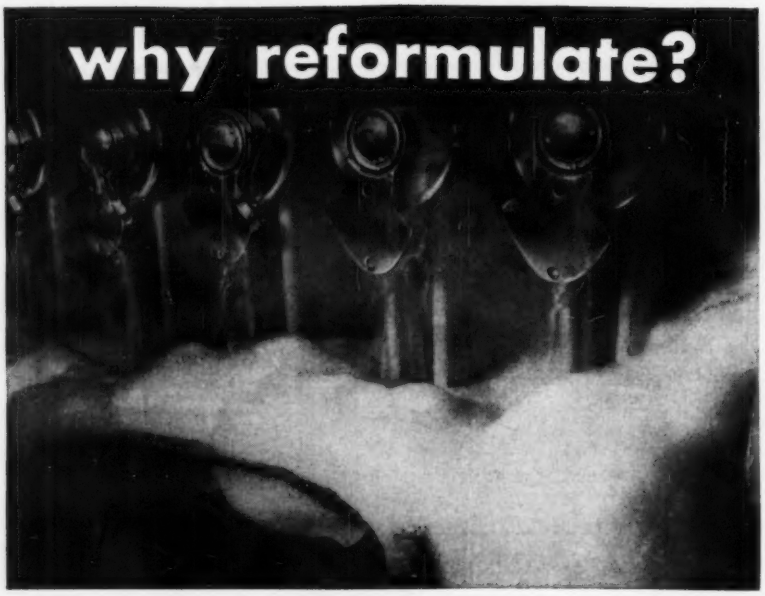
Chemstrand is the second-largest acrylic fibers producer; its output accounts for about 25% of the market. It obtains most of its monomer from Monsanto. Last week Monsanto, which owns 50% of Chemstrand's stock, moved to buy the other half from co-owner American Viscose (*CW Business Newsletter, Oct. 22, p. 22*).

Chemstrand has had free choice in selecting its suppliers—it could switch to another acrylo producer if it wanted to. Now Monsanto's plan to take over Avisco's share of Chemstrand makes it clear that Monsanto senses the wisdom of insuring itself of a ready outlet for at least part of its acrylo capacity.

The Chemstrand and Du Pont fiber operations dwarf all others. Even if the other fiber makers were to run at full capacity by '64-'65, they could take only 45-50 million lbs./year of acrylonitrile.

Acrylic Roller Coaster: Another problem that will be faced by acrylonitrile producers is the increasing sensitivity of acrylics, as well as other noncellulosics, to fluctuations in business conditions. Previously, acrylic fibers were landing in new markets so fast that their total volume grew despite some setbacks in the textile industry. Now, however, these fibers are reaching maturity and volume will rise and fall with the changing demands of the textile industry. This, of course, will be reflected in varying demands for acrylonitrile.

The short-term outlook for acrylic



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Application

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Company_____

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U.S. Acrylonitrile Capacity

	'60	Due '62
American Cyanamid Fortier, La.	100	—
Monsanto Texas City, Tex.	100	—
Union Carbide Institute, W.Va.	70	—
B. F. Goodrich Calvert City, Ky.	35	—
Sohio Chemical Lima, O.	40	—
Du Pont Memphis, Tenn.	50	—
Beaumont, Tex.	—	50

fibers is already starting to cloud up a little. During first-half '60 demand for these fibers held up well, but in the past quarter they fell off sharply. While the industry's fiber demand is expected to top the 150-million-lbs./-year mark this year, '61 and '62 are more uncertain. Over the long term, however, acrylics will continue their upward movements (*CW, June 11, p. 74*).

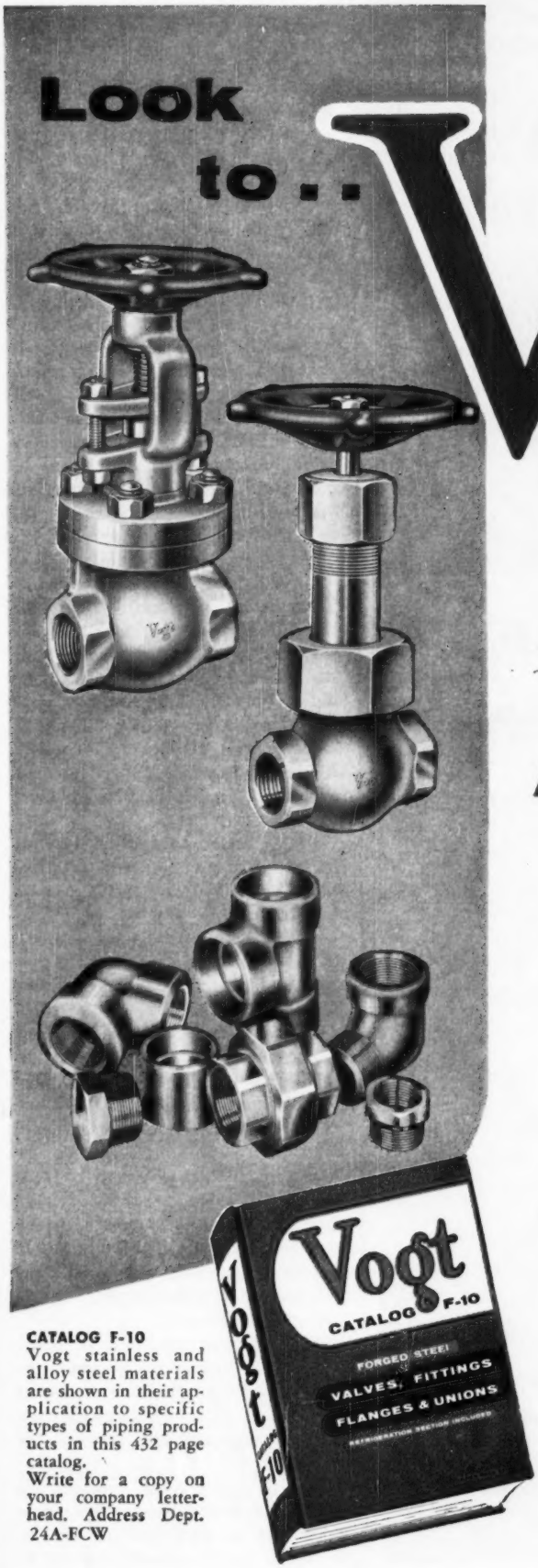
Time to Think: The startup of Du Pont's Memphis unit will not mean immediate discontinuance of the company's present source of supplies, partly because it will take time to work out the bugs in the new unit before operations can be pushed up to capacity. Besides, the Memphis unit will not be able to supply all the company's internal needs. Therefore, acrylonitrile producers still have some time before this outlet dries up.

Which way out? There are two possible solutions for other producers who are certain to have large unused acrylo capacities:

- Develop new captive uses or expand present markets for acrylo.
- Divert into other products the raw materials that would be used in acrylo manufacture.

Aside from fibers, the next two largest outlets for acrylonitrile are nitrile rubbers and plastics.

In the N-type rubber (acrylonitrile-butadiene) field, growth has been steady but not spectacular. Production in '54 was 21,400 long tons,



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jumped to 32,625 tons in '55, rose to 34,023 tons in '56. Output then tapered off to 31,976 tons in '58. Last year another large increase was recorded—to 43,169 tons.

So far in '60 demand for this rubber has slipped. In the first eight months of the year output was 25,031 tons vs. 28,181 tons during the same period of '59. Since only about 33% of the rubber's content is acrylonitrile, it's obvious that a very large gain in rubber consumption would be needed to boost the use of acrylo.

Plastics Push: Because plastics have been moving up rapidly, styrene-acrylonitrile copolymer output has increased almost 136% in the past five years—from 13.6 million lbs. in '55 to 32.2 million lbs. last year. And this outlet for acrylo will continue to grow.

In addition, the markets for terpolymers of acrylonitrile (acrylonitrile-butadiene-styrene) have also seen marked growth. Just last week Monsanto started construction of a multimillion dollar facility at Addyston, O., to produce a new family of styrene-based plastics, (*CW, Oct. 22, p. 29*). It's believed both ABS and styrene-acrylonitrile resins will be produced there.

And Goodrich Chemical recently started production of ABS resins at its Akron, O., plant (*CW Market Newsletter, Aug. 13*).

While these plastics are expected to show some promising growth during the next few years, the over-all effect on acrylonitrile will be slight since acrylonitrile is only a small part of the resin.

Utilization of Raw Materials: One way of diverting acrylonitrile raw materials to other uses to reduce acrylo overcapacity—an approach often discussed in the trade—is to upgrade hydrogen cyanide into methacrylates. Two companies that might possibly use this approach are Monsanto and American Cyanamid, since both make acrylonitrile via the acetylene-hydrogen cyanide route.

The selling or upgrading of acetylene and ethylene oxide would be other considerations. But such moves do not help in using the already installed equipment for turning out acrylo.

The fact that other end-uses for acrylo raw materials have been considered at all indicates that the industry is sharply concerned about its

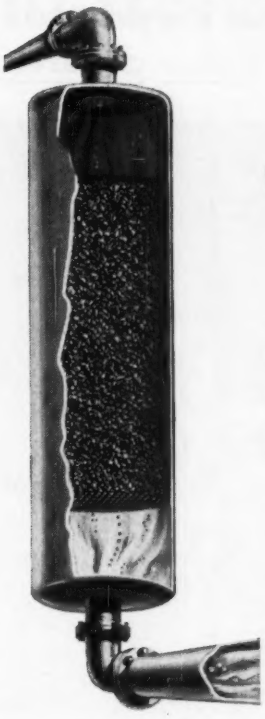
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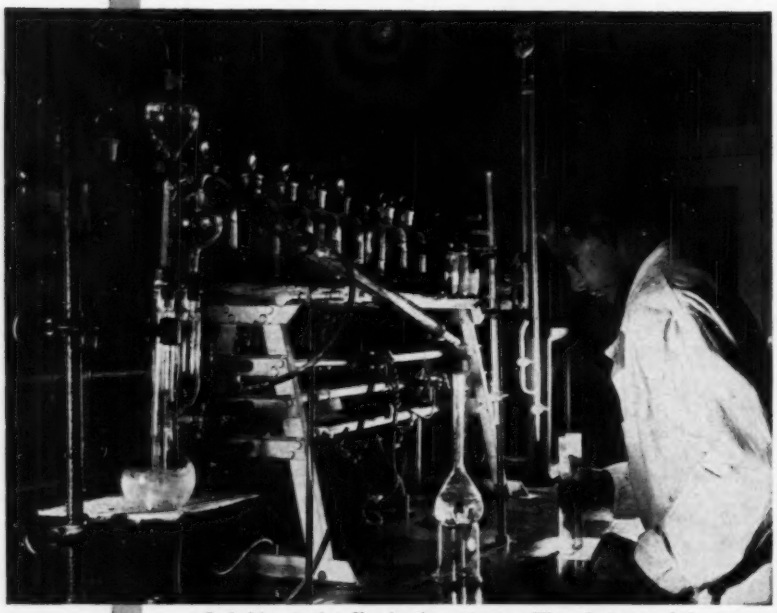
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future in acrylonitrile markets.

For acrylonitrile manufacturers that have large captive outlets for the chemical, the next few years hold few problems. But for others, the questions of "what to do with raw materials" and "what to make with acrylo equipment" are very hard to answer.

Chlorine, Caustic Gain

World production of chlorine reached a record 8.1 million short tons in '59, according to Bert Cremers, vice-president and director of Wyandotte Chemicals Corp., at last week's 32nd Congreso Internacional de Quimica Industrial in Barcelona, Spain. Caustic soda also set a record, with world production estimated at 11.4 million short tons.

Originally, the electrolysis of salt brine was geared for the preparation of caustic soda, Cremers told the group, with chlorine being considered an "unfortunate" by-product. But during the past 30 years demand for chlorine increased 40-fold, and today it is the product of greatest demand.

The evolution of petrochemicals, along with rapid advances in the field of organic synthesis has been behind these rapid increases, with the chemical industry being its own best customer.

In the U.S. about 81% of chlorine demand is for chemicals, 15.5% goes to pulp and paper; 3.2% for sanitation and 0.2% miscellaneous.

A breakdown of caustic soda use in the U.S. shows 32.4% going into chemicals; 15% into rayon and film; 11.4%, pulp and paper; 6%, soap and cleaners; 5.4%, petroleum refining; 5.4%, textiles; about 5.3%, net exports; and about 19.2% into all other uses.

Process Changeover: The rapid growth of chlorine has had a profound effect on caustic soda production. By '59, for example, only 10% of the caustic soda produced in North America came from the lime-soda process.

This same trend is also occurring in other countries. In '50 about 50% of world caustic soda output was made by the caustification of soda ash. By '59 only 33% of caustic output came from this process, the trend shifting in favor of the electrolytic process.

World Capacity: Cremer estimates

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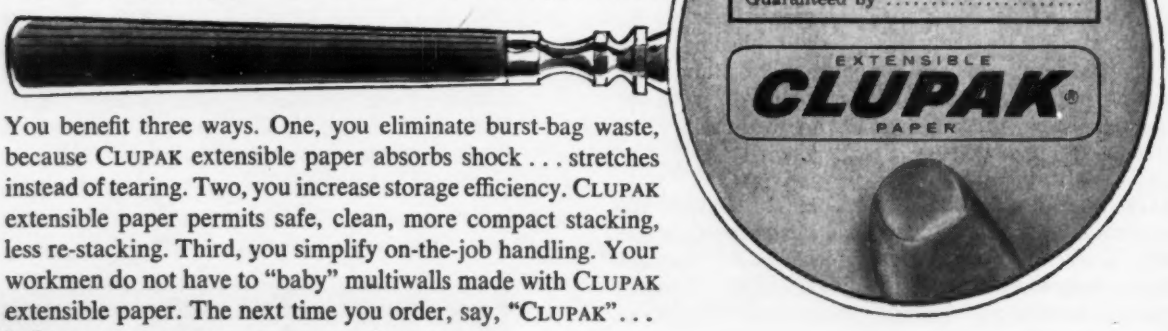
Chemical Week

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these capacities of chlorine and caustic soda in various areas of the world (in tons/year):

North America—61 chlorine producers with a total capacity of 5.5 million tons; 61 caustic soda makers with a total capacity of 6.5 million tons.

European Economic Community—67 chlorine producers, 1.7 million tons; 70 caustic makers, 2.6 million tons.

European Free Trade Area—29 chlorine makers, 921,000 tons; 29 caustic producers, 1.4 million tons.

Russian bloc—30 chlorine producers, 697,000 tons; 36 caustic makers, 1.6 million tons.

Europe and other—37 producers making 130,000 tons of chlorine and 340,000 tons of caustic soda.

Africa—10 chlorine producers with a capacity of 34,000 tons, and 10 caustic makers with a capacity of 35,000 tons.

Central and South America—43 chlorine producers, 153,000 tons; 45 caustic soda makers, 255,000 tons.

Asia and South Pacific—64 chlorine makers with a capacity of 648,000 tons; 88 caustic producers, 1.8 million tons.

Total world chlorine investment on a replacement basis, according to Cremers, would be approximately $2.7 billion.

Safety First: Efforts by the Chlorine Institute and other world chlorine groups have helped the industry rack up a remarkable safety record throughout the world.

In '59, for example, the U.S. chlorine industry turned out over 4 million tons of product with only one fatal accident (this occurred during a power interruption while a bricklayer was working on a stack).

As new methods and larger plants come into existence, better and safer methods will be required, not only for the production of chlorine but also for the many new uses to which this product is being put daily.

With the standard of living rising throughout the world and chlorine and chlorine-derived products playing such an important part, demands for chlorine will continue to grow rapidly during the next few years. To help insure a safe industry, efforts must be directed toward providing a worldwide exchange of safety information of all kinds.

Tracers TO THE CHEMICAL PROCESS INDUSTRIES

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Prefer N.E. territory medium size Mfr. or Distr. 10 years selling experience, degree. PW-5513, Chemical Week.

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If you are a manufacturer seeking new or added sales outlets—or if you are a manufacturer's agent or chemicals distributor with the capacity, time and energy to take on additional lines—make your interests known in this column of Chemical Week. The right agent or jobber teamed up with the saleswise manufacturer makes the right combination for the hard selling days ahead. There's profit for both, which can be initiated through low-cost classified advertising. Write Employment Opportunities, Chemical Week, P.O. Box 12, New York 36, N.Y.

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Davenport 8' Dia. x 60' Long Rotary Dryers, 7/16" welded shell, complete. Perry Equipment Corp., 1415 N. 6th St., Phila. 22, Pa.

Vulcan 72" Dia. x 46' -10" High copper bubble cap column, 40 trays—Vacuum. Perry Equipment Corp., 1415 N. 6th St., Phila. 22, Pa.

Air Compressor, 2500 c.f.m., steam. Ingersoll-Rand XPV-2. New 1956; never installed. $40,000. Jesse H. Jones & Associates, Saint Johns, Michigan. CAnal 4-7031

Stokes Tabletting Press, DDS-2, Ser A-80750, 21 station, with 7½ HP U.S. VariDrive, Jesse H. Jones, St. Johns, Mich. CA 4-7031.

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Surplus Wanted—Chemicals, Pharmaceuticals, Oils, Acids, Plasticizers, Resins, Dyes, Solvents, Pigments, Etc. Chemical Service Corporation, 96-02 Beaver Street, New York 5, N. Y. HAnover 2-6970.

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Chemical Week

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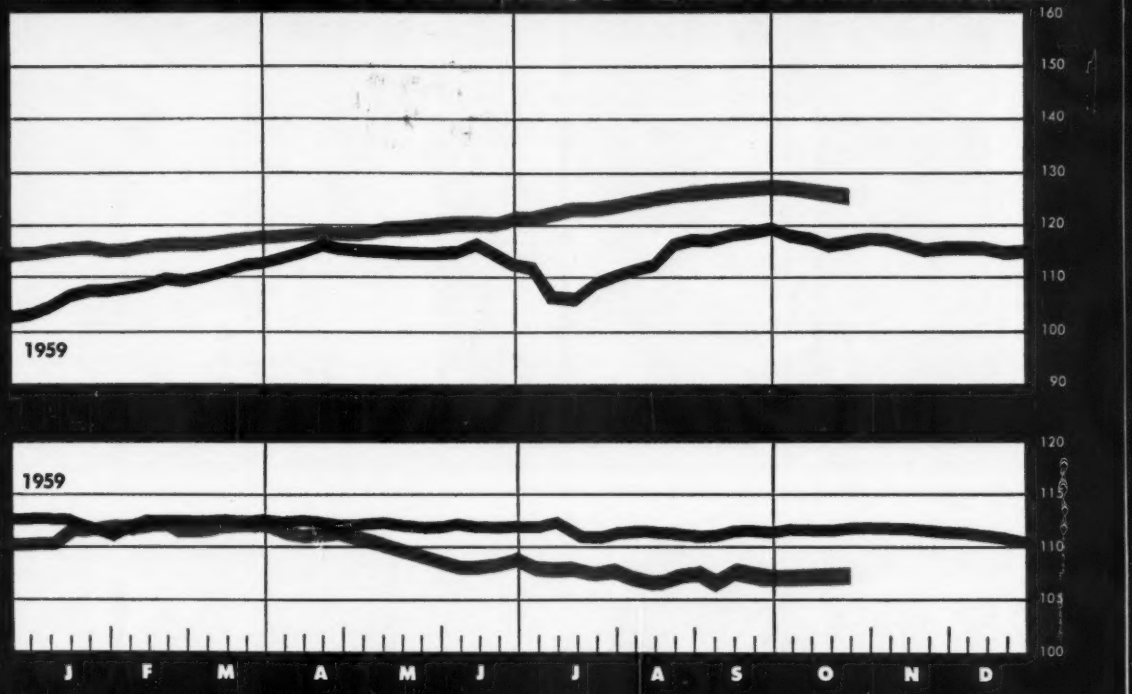
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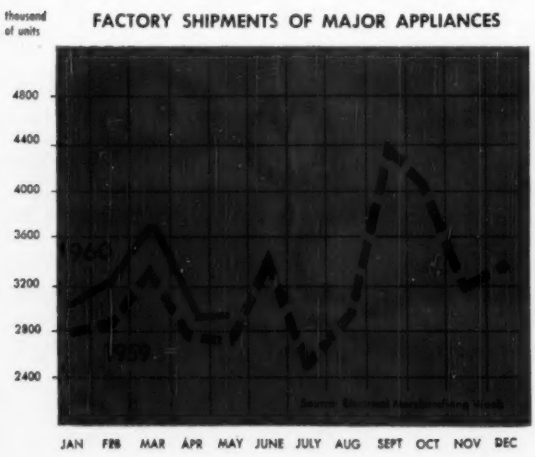


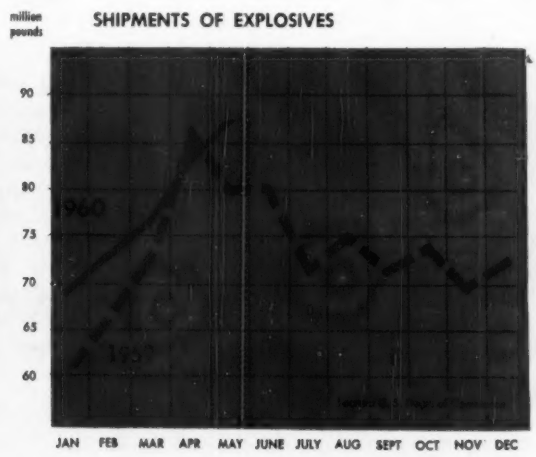
OCTOBER 29, 1960

WEEKLY BUSINESS INDICATORS	*Latest Week*	*Preceding Week*	*Year Ago*
Chemical Week output index (1957=100)	124.8	124.9	118.3
Chemical Week wholesale price index (1947=100)	107.5	107.0	111.5
Stock price index (12 firms, Standard & Poor's)	45.03	45.05	57.68
Steel ingot output (thousand tons)	1,556	1,579	371
Electric power (million kilowatt-hours)	13,736	13,725	12,861
Crude oil and condensate (daily av., thousand bbls.)	6,823	6,802	6,839

TRADE INDICATORS (million dollars)	Manufacturers' Sales			Manufacturers' Inventories		
	Latest Month	*Preceding Month*	*Year Ago*	*Latest Month*	*Preceding Month*	*Year Ago*
All manufacturing	30,140	30,440	29,268	54,930	54,900	52,116
Chemicals and allied products	2,310	2,300	2,157	4,180	4,140	3,907
Petroleum and coal products	3,140	3,190	3,071	3,280	3,290	3,332
Paper and allied products	1,090	1,080	1,011	1,630	1,610	1,473
Textile products	1,180	1,230	1,250	2,690	2,690	2,495

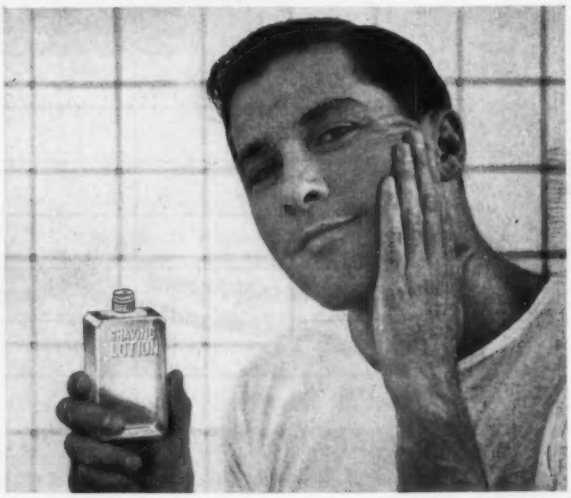
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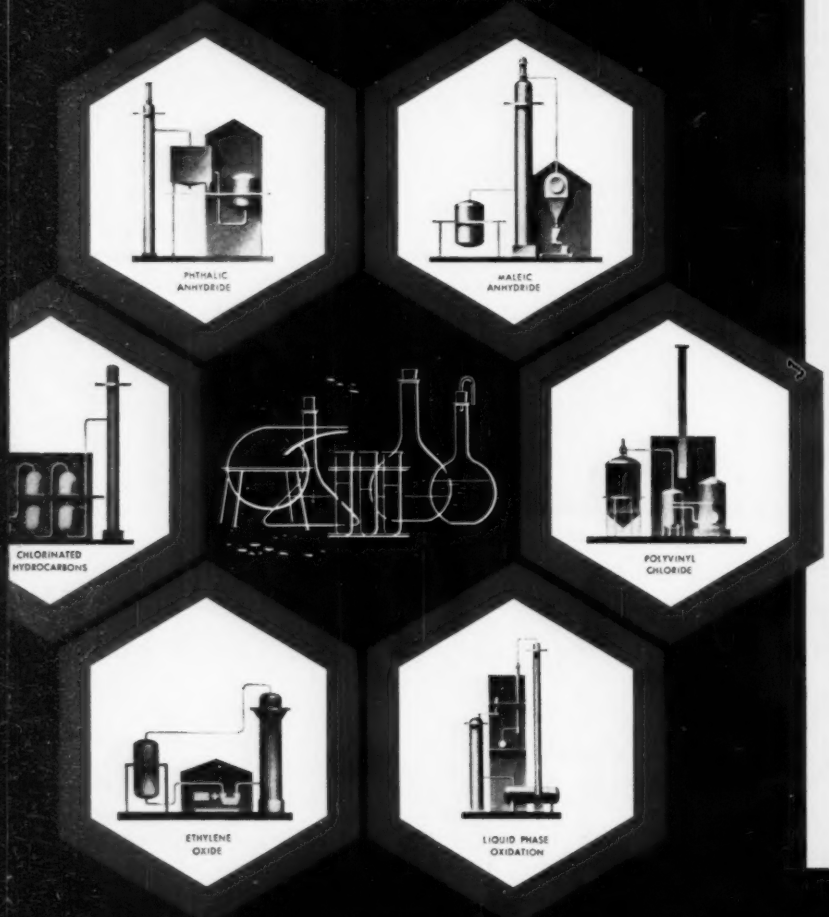
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continues to lead in the development of

New Chemical Processes



Another example of chemical process skill

SD Phenol Process

Scientific Design's recently announced phenol process, which effectively converts benzene to phenol with air, offers many important technological and economic advantages. It is the result of a deliberate research effort in SD's own laboratories at Little Ferry, N. J., to find a process which features low capital investment and absence of by-products for sale or other disposal.

This process is, therefore, well suited to any size, including smaller "package plant" installations. It assures lower production costs and profitable output. It is outstanding in larger sizes where its economies make phenol a very attractive product.

The SD process offers a basic simplicity in concept and for the first time a scale of operation within the scope of many chemical producers throughout the world.

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